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ABSTRACT

This report of the Lake Mohonk Conference represents a first attempt to establish cross-national quantitative measures of the International Association for the Evaluation of Educational Achievement. It was attended by specialists in educational measurement and comparative education, economists, sociologists, vocational educators and educational, social and vocational psychologists, from the United States, England, Sweden and Germany. The 14 papers cover the following topics: 1) comparative education as a field of inquiry and as an aid to inquiry into educational achievement; 2) the reflection of societal characteristics within the school; 3) political socialization: its implications for an international study of mathematics achievement; 4) relevance and fitness analysis in comparative education; 5) problems of aggregating scores for a measure of total achievement; 6) aggregate costs, output, and school schievement; 7) the "fit" between education and work; 8) a social model for considering the effects of interpersonal forces on the pupil as a learner; 9) overt versus latent teacher attitudes; 10) the reward system of the school; 11) roles and social expectations in school and work systems; 12) research on self concept; 13) the role of continuing education, and 14) lifelong learning in the "educative society". (MBM)

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TOWARD A CROSS-NATIONAL MODEL OF EDUCATIONAL ACHIEVEMENT IN A NATIONAL ECONOMY

The Report of the Lake Mohonk Conference

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the practice of education to the modes of thinking of the social sciences. It is in this realm, perhaps, that the book will find its greatest significance.

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FOREWORD

This report is one of a growing number of publications resulting from the program of research begun in 1958 by the International Association for the Evaluation of Educational Achievement (IEA). As such, it illustrates one of the attributes of effective research programs -- that they lead to associated studies often of considerable significance.

The attempt here is both ambitious and modest. It was ambitious to make a first attempt to synthesize several of the social sciences in the service of studies of the products of schooling. It is a modest attempt, however; all associated with this volume acknowledge that this is a beginning and no more. A sound beginning, we hope, and a useful one, we know, for the results of the international conferences reported here have already found their way into the design of the current series of IEA studies.

Professor Super undertook a difficult, taxing responsibility in both editing the proceedings of the conferences and in attempting a synthesis of them in his comprehensive model. We who planned the conference had no right to expect of him what he has done; we are all the more grateful to him for thus leading the field of comparative education into this new area.

Dr. Alice Scates, of the United States Office of Education, deserves special acknowledgement by those associated with these conferences. Her advice while the conferences were being planned, and her participation in the work, were both invaluable.

This report will be of immediate interest, of course, to that little band of comparative education researchers who carry on studies of school achievement. It will, we hope, find a broader audience among the comparative educationists. Its audience would not be as wide as it ought to be, however, if it did not also include that much larger group of scholars of education who seek to relate

I

INTRODUCTION

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Each year, for several years, the writer has participated in the budget hearings of a board of education, and listened to the questions raised by townspeople about the proposed expenditures of the public schools. Each year some citizens trained in economics or familiar with business concepts and practices have asked what evidence the school board has concerning the quality of its educational program and concerning the improvements which given expenditures can be expected to produce. The lack of quantitative measures of the effectiveness of education, if not a cause of misgiving to those who have faith in professional judgment, is at least a cause of embarrassment to them when it serves as a propaganda weapon for those who oppose budget increases for the presumed improvement of education.

And it is not just those who want to keep down public expenditures and personal taxes who ask about the quality of education. The emphasis on excellence which has characterized much educational writing and discussion during the past decade implies the need, if not the ability, to assess quality. Just how do we do it?

Possible Approaches

There are four basic approaches to the evaluation of the quality of education. These involve the assessment of the

1) inputs into the system
2) structure and operations or processes used by the system
3) products or outputs of the system
4) utilization of the output by society.

At times the emphasis has been on one, at times on the other, of these types of criteria of quality, and sometimes it has been on some combination of such criteria. But rarely have criteria been selected after systematic consideration of the various types, nor on the basis of the conceptual adequacy of a particular combination, of criteria.

Cross-National Studies and Conceptual Models

The work of the International Study of Educational Achievement (Foshay, 1962; Husén, 1967) has led a number of educators to devote considerable attention to the question of the various criteria by which education may be judged and to the conceptual models in which they may be organized. The immediate stimulus to this effort was the newly realized possibility of making cross-national comparisons of educational achievement, and the desire to relate any such comparisons to the important social and economic characteristics of the participating countries. It will help to view these efforts to develop a model in the perspective of these international studies.

For some years, during the 1950s, students of comparative education had been dissatisfied with existing methods of comparing the effectiveness of education in different countries. In 1958, simultaneous suggestions were made by Arthur W. Foshay of Teachers College, C. Arnold Anderson and Benjamin Bloom of the University of Chicago, and W.D. Wall of the National Foundation for Educational Research in England and Wales, for the development of measures of educational achievement which would be equally usable in various countries. These efforts led, in 1959 and 1960, to a series of meetings at the UNESCO Institute for Education in Hamburg, Germany, and to the planning and conduct of a pilot study of school achievement in 12 countries (Foshay, 1962). The principal contribution of this project was methodological and administrative: It demonstrated in a preliminary way that school achievement tests can be developed for use in various languages and in various countries, that the necessary sampling, testing, and data analysis procedures can be carried out, and that conclusions can be drawn concerning the achievement levels of the school systems of different countries.

As this pilot study was completed a number of educators and behavioral scientists from a variety of specialities were brought together in another, unconnected, conference at the UNESCO Institute in Hamburg, to consider what basic data are relevant in the comparative study of education (Holmes & Robinsohn, 1963). In this working conference it was recognized that a variety of data are needed, describing systems in terms of their resources, their processes, and their productivity.

The first large-scale and intensive international study of educational achievement was planned, with the completion of the pilot study, by an expanded group of representatives of educational research centers in some twenty countries. This group has since incorporated as the International Association for the Evaluation of Educational Achievement.

Mathematics was selected as the first school subject to be studied in a more thorough manner, in view of the important and easily translated character of its content. Hypotheses were developed concerning the determinants of achievement in mathematics: these dealt with the socio-economic context, the organization and administration, and the methods and content, of education.

The Mathematics Study

It will help here, not only as a matter of interest, but as an illustration of one approach to the development of a model, and as a backdrop for references in some of the papers which follow, to review some of the major findings of the Mathematics Study. Reported in two volumes edited by Torsten Husén (1967) it was given considerable attention by newspapers in many countries of the world.

The inquiry took five years to complete, and involved the testing of 133,000 pupils aged 13-19+ attending 5,450 schools in 12 countries. The countries participating were: Australia, Belgium, England, the Federal Republic of Germany, Finland, France, Israel, Japan, the Netherlands, Scotland, Sweden, and the United States.

The participating research center from each country was responsible for the administration of tests and the collection of data within its boundaries. The costs of operations within each country (e.g., in carrying out the testing program) were borne by the country concerned, and the international costs were defrayed by the United States Office of Education. The project was not designed as an international contest. The object was to discern more clearly the relationships between aspects of organization, curriculum and teaching, and social factors, on the one hand, and mathematics performance on the other. Such research does make it possible, however, for a country to improve its educational system by analyzing its strengths and weaknesses in comparison of its methods with those of other countries, obtaining the benefits of longitudinal studies by means of short-term, cross-sectional, studies.

Sampling. Thirteen was chosen as a testing age because it is the last point at which nearly all children of an age group are still in school in each of the participating countries. Samples at this age were drawn from (a) thirteen-year-old children as an age-group, and (b) all pupils in the grade in which the majority of thirteen-year-old students were to be found. Sampling purely in terms of chronological age would, in some countries, yield a group which was heterogeneous in terms of grade.

Testing at the end of the secondary level of education involved samples of (a) students studying mathematics, and (b) students who were not studying mathematics.

Mathematics Tests. Earlier cross-national studies had been based on tests designed for use by the schools in a single country, which, even when translated and adapted, may have given special advantages to the students of that country.

The prime difficulty in carrying out an investigation of this kind was that of constructing a valid test of achievement in mathematics which could be applied to students in 12 different countries. In essence, this involved convening, first of all, national panels to examine prevailing curricula and to draw up specifications for tests that would adequately evaluate the achievement of students at various stages in the courses they were pursuing; and, secondly, submitting these specifications to an international panel whose task it was to frame specifications for a suitable international test.

Other Variables. The mathematics tests provided the measure of output or the criterion against which the influence of a wide variety of factors could be assessed. The examples of factors give some idea (not in the original terminology) of the range of those which were examined as being possibly associated with level of achievement:

1) Organizational Variables, e.g., the age at which formal schooling starts and terminates; co-educational or single-sex; selectivity vs. comprehensiveness.

2) School Variables, e.g., size of school; size of classes; number of subjects taught; number of hours devoted to mathematics; ability grouping; methods of instruction; opportunity to learn the subject matter of the examination; homework.

3) Teacher Variables, e.g., sex of teacher; length of professional training; amount of in-service training; the extent to which teachers are free to determine curriculum and methods of instruction.

4) Parental Variables, e.g., father's occupation; father's and mother's educational background; pressure put on students to study.

5) Student Variables, e.g., sex and age of student; attitudes towards mathematics, school, and various other aspects of the environment; interest in mathematics; vocational expectations and aspirations.

6) Community Variables, e.g., financial support, value placed on education.

Results and Conclusions. The IEA study reported the performance of each country by the percentage of its students reaching various levels on the test scores. Students were compared against international standards derived from the combined performance of students from all countries in a given age or grade group.

Of the 12 countries, only two showed less than 40% of students reaching the 'upper half' of the international standard; one of these was the U.S.A. Four countries showed percentages of from 50% to 70%, and four of over 70%. Four countries showed relatively high percentages of pupils reaching the 'top tenth', and three of these (Belgium, England and Japan) scored relatively high also as regards the numbers of pupils who reached the 'top hundredth' standard. Such figures must be regarded in the light of the degree of comprehensiveness of the educational system, and the power of the latter to retain pupils to the final year. The 12 countries differ greatly in the percentage of the age-group reaching the final (pre-university) year of secondary school. In the Netherlands, for example, it is only 8% - and in all other cooperating European countries except Sweden, less than 20% - while in Japan it is 57% and in the United States it is 70%.

The percentage of the age group reaching the final year of secondary school who are enrolled in mathematics varies from 4% in Belgium to 18% in the United States. This, also, is an extremely important figure in determining the amount of mathematics talent a country is developing.

Considering both the percentage of the age group studying mathematics and the level of mathematics performance, the study determined the percentage of the age group reaching given international standards of mathematics achievement.

In terms of the percentage of the age group reaching the upper tenth on the international standards, six countries have relatively high scores, and five countries relatively low scores, there being a clear differentiation between the two categories. The U.S.A. is just above the middle, at the bottom of the "high" group.

While there are many differences in the countries involved in the IEA study, they are all highly developed nations. How does the level of economic development relate to mathematics achievement in a wide range of countries?

The extent of certain kinds of differences between nations in mathematics achievement is shown by the fact that Japanese 13-year-olds who are the children of unskilled workers had higher test scores than 13-year-olds in the United States who are the children of college trained professional workers.

The United States and Japan appear to have the least amount of selection of a socio-economic basis. The greatest amount of socio-economic selection is apparent in West Germany, the Netherlands, England, and France. In these countries, pre-university education is to a large extent limited to the children of better educated, higher occupational status parents.

"Comprehensive" and "selective" school systems were compared. It was found that, whereas 13-year-olds in selective academic schools tend to do better than their counterparts in comprehensive schools, this superiority is no longer apparent when the scores of the pre-university groups are compared. Furthermore, 13-year-old students following general courses do better in comprehensive schools than do students following similar courses in schools not containing academic pupils. Although the total group of American mathematics students in the senior year of high school scored far behind their age-mates in other countries, the top 4% of American seniors did as well as the top 4% in countries with much more selective systems. In spite of the differences in the schools, the major variable in accounting for differences in performance in mathematics was the opportunity the students had been given to learn mathematics. Variations in the length of the school week appear to have little influence on mathematics achievement. On the other hand, mathematics scores rise sharply, within countries, both with the amounts of mathematical homework and the total homework.

Boys do better on mathematics tests than girls, and boys have more interest in mathematics. In coeducational schools, however, these differences are much smaller than they are in non-coeducational schools: girls tend to perform better in mathematics relative to boys, in coeducational schools, than in single-sex schools.

Class size has little relationship to mathematics scores. The average class size ranged from 24 in Belgium to 41 in Japan at the 13-year-old level, and from 12 in England to 41 in Japan in the final year of secondary school: the countries which were at the extremes on class size were all high in mathematics achievement.

So much for the methods and results of the Mathematics Study. The study is so relevant as the best concrete illustration of existing models, and referred to often enough in later papers, that this much detail should be helpful.

Relating Education to the National Economy

As the analysis of the data collected in the Mathematics Study proceeded it became clear that more attention needed to be devoted to theoretical models for studies of this type. Varied though were both the hypotheses concerning the determinants of achievement, and the breadth of the three categories into which they fell, it was nonetheless true that the Mathematics Study had used an improvised model of school achievement rather than one which had been systematically constructed. It consisted, in effect, of the assumption that there are a variety of socio-economic, administrative or organizational, and instructional determinants of what pupils learn, that what they learn can be measured and aggregated, and that relationships between specific determinants and aggregated measures of achievement can be ascertained.

The second major international study by the IEA is planned to cover, in successive stages, the natural sciences, reading comprehension and literature in the mother tongue, French and English as foreign languages, and civic education.

It became important to consider the conceptual framework, for such studies seem likely to be made with increasing frequency now that their feasibility has been demonstrated. Accordingly, Arthur W. Foshay and Benjamin Bloom took the lead in developing a proposal for a series of working conferences on conceptual models for relating education to the national economy. Torsten Husén agreed to chair the conferences, and the writer became the chairman of the planning committee and the editor of this report.

The two conferences in this series, one held at Hamburg in November, 1966, and the other at Lake Mohonk (N.Y.) and Teachers College in May, 1967, were attended not only by specialists in educational measurement and in comparative education, but also by economists, sociologists, vocational educators and educational, social and vocational psychologists. The attempt to broaden the interdisciplinary base of the project was furthered by the advance preparation of working papers for each of the conferences, and by the intensive work of specialist groups on each of the topics developed, first by the Planning Committee, and then by the first conference.

The Hamburg Conference

Consideration of the variables to be considered in evaluating the output of an educational system led to the identification of 12 topics needing careful study. These were developed in a preliminary way by working committees at the Conference, and suggestions were made as to persons who might best prepare working papers on them for the second conference. The two or three page discussion of each topic was turned over to the writer of the working paper after agreement had been reached with appropriate writers, and the 14 papers which follow this *Introduction* were prepared by the authors listed and served as working papers for the Lake Mohonk Conference.

The Lake Mohonk Conference

The second conference in this series took place at Lake Mohonk, N.Y., six months after the first conference. It was attended by all of the Planning Committee (listed on the title page), all of the authors of working papers (listed) in the Table of Contents), and by a small number of invited participants (M. Michel Debeauvais, Paris; Dean R. Freeman Butts, Prof. Harold J. Noah New York; and Dr. Alice Scates, Washington, D.C.). The procedure followed was that of brief summary of each paper by its author, leading to discussion in depth of issues raised by the paper, after which four working committees were formed to prepare materials for discussion by the whole conference and to serve as guides to further revision of papers by their authors and to further writing by the Conference Editor.

The next 14 papers are the working papers for the Conference, revised by all but two of the authors after Conference discussion. They are followed by the Editor's revisions of the reports of the four working groups, and by the Editor's attempt to synthesize what he himself learned from the Conference in the development of a tentative model for studies of education in relation to the national economy.

The attempt to put into definitive form the reports of the working committees will no doubt impress those who participated in the Conference as inadequate, for it cannot capture the richness and the stimulating quality of the group interaction.

The attempt at a synthesis will certainly seem to fall even shorter of its goal, for the variety of economic, educational, psychological, and sociological variables involved is almost infinite, and their interaction in varying combinations and permutations is beyond coping with in one model. But, as the results of serious individual and group efforts by persons who possess some of the relevant competencies, these efforts may be of interest.

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II

COMPARATIVE EDUCATION AS A FIELD OF ENQUIRY AND AS AN AID TO ENQUIRY INTO EDUCATIONAL ACHIEVEMENT

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Comparative Education Today

The present paper offers a conceptual framework for comparative education, an illustration of its main features with reference to actual school systems, and some brief illustration of its methods or operational contexts and of the levels appropriate to these. It does this in the context of our present cross-national focus on conceptual models in research.

Space does not allow separate treatment of the following concepts of comparative study, which nowadays represent a crescendo of committedness:

1. as an informative-analytical aid to enquiry by students of education and other social scientists by showing the wholeness of cultures, yet their international variety;
2. as a general means or technique for analyzing the general situation where a particular study or experiment is proposed, by showing what may be idiomatic parts of a peculiar local context, and what may be transcendent features;
3. as a specific aid to topical enquiries themselves (such as IEA), and also to large-scale national or international appraisals of educational effectiveness;
4. as an aid to the effective implementation of conclusions from IEA-type studies, and also to the establishment and fulfillment of programs arising from public decision (King, 1967).

All these aspects are treated for the purposes of this paper as complementary and concurrent aspects, rather than picked out for separate treatment.

A first important point to make is that comparative education itself is undergoing extremely rapid change. Consequently, nineteenth century precedents and even the example of the inter-war years may be largely irrelevant now, at least for the purposes of this present enquiry. Many existing studies of comparative education may be useful as historical records or as information suited to the initial preparation of teachers and administrators, but they may seem beamed in the wrong direction when we consider other present needs. That is because too little account has been taken of four recognizable phases of development in comparative education. They may be outlined as follows:

1. the use of comparative studies in the nineteenth century for the establishment of particular institutions like selective schools, universities, and technical training;
2. the early twentieth century attempt to guide universalization of particular institutions such as elementary and secondary education;
3. post-1945 attempts to guide national reappraisal of education and its development, but with a growing international awareness of educational trends themselves;
4. post-1960 and current attempts to guide what are essentially political, economic, and social decision in international perspective, by using educational insights and researches as a mainspring, but with insights from: (a) the other social sciences; (b) computable models of national socioeconomic development; and (c) empirical studies and experiments of particular kinds. At this stage there is growing commitment to helping formulate a strategy of decision and developmental programs of a practical kind.

This progression in comparative education brings it closely into line with trends in the other social sciences of an empirical or action-oriented kind, but it should be noted scrupulously that the kinds of action- or decision-oriented enquiry just mentioned produce reliable results only insofar as we can rely on:

1. the hypothesis underlying the enquiry;
2. the utility of the questions asked;
3. the kind of material fed into the enquiry;
4. its supposed outcome and purpose;
5. its feasibility.

There is no need here to labor a few points that must be stressed over and over again in any social (and especially educational) comparisons. One of these is the cultural involvement and bias of every perception. No one perceives phenomena in any way that is detached from his own personal history or cultural nexus of language, notions, value patterns, aspirations, and awareness of institutional support. Bias and cultural idioms affect our hypotheses and sense of purpose. Nor can we escape from our personal or group consciousness of occasions or of a climax of decision. Individually, as groups, and still more as member of national systems, we display an involvement which precludes the possibility of purely objective observation, experiment, and judgment.

If comparative education did nothing else, it could offer the basic awareness of relativity. By studying the enfolding force of cultures or local contexts we can detach ourselves a little. Seeing others' involvement may be an aid to objectivity in our own researches. We may disentangle the environmental accidentals from the transcendent problem, or the peripheral from the central points of our enquiry. We may also discern possible factors overlooked in first hypotheses, and get a clearer picture of single variables and of the real-life aggregation of variables.

As part of our general education, and perhaps as part of our professional preparation for the kind of job we have in hand, we need to become aware of our own relativity and at the same time pay proper heed to the dynamics of context, both topically and in terms of development. One of the best ways of beginning is to undertake a well-rounded study of some other school system in a cultural context alien to our own. Thus we observe how the various parts of formal and informal education are interlocked in a tangle of influences. At any one place and time, these add up not only to a pattern of culture in Benedict's sense but to a particular conjunction of topical influences which may perhaps be described by the biological term ecology or by the physical term field. They also point to what Karl Popper calls the logic of situations.

Consequently, we see not only in others but in ourselves the extremely idiomatic and topical nature of all the following things, both separately and still more in interconnection:

Centers of interest and recognition of problems;

Formulation of hypotheses; setting up of empirical enquiries or formal tests or experiments;

Interpretation of the significance of experiments, challenges to these interpretations and direction of further enquiry, awareness of possible outcomes;

Disposition to use the results;

Awareness of possible instrumentation for further enquiries or for the implementation of our decisions;

Awareness of the resources offered to us by other disciplines, by other studies already published, or by relevant experimental situations in other countries.

Comparative studies need not relate only to cross-national or cross-cultural studies, but may nowadays relate with increasing force to cross-disciplinary studies. That is an observation with particular relevance for IEA studies or for research projects connected with the economic, social, and political development of countries and regions.

The scale, speed, and incalculable consequences of technological and social change throughout the world (now associated with unlimited expectation of what may be achieved by educational reform) make it impossible to rely any longer on already established information and criteria. The inescapable necessity for continuous review of every decision or every piece of information's relevance demands reliance upon comparative reappraisal at every point, instead of the supposed universals, theories, or built-in-laws on which so much reliance used to be placed.

The Study of Existing Data

Members of the IEA project have already noticed, when dealing with colleagues in other countries, that such apparently universal words as "science" or "research" have different meanings in different national or cultural contexts. Is science a speculative branch of academic learning, akin to philosophy? Or is it an inseparable blend of that kind of learning together with the practice of empirical or field enquiry, the use of appropriate techniques, training in the use of techniques, and the availability of suitable instruments?

To ask the same questions in other terms, is research conceived in terms of pre-industrial isolation from society? Is it at a proto-industrial stage of development? Or is it akin to modern business in its methods, purposes, and instrumentation? Without losing detachment and scholarly integrity, does research seem to be doing a practical job with social relevance? Has our comparative survey a considered purpose? If so, it differs considerably from the library-centered researches with which so many universities and supposed research centers are still preoccupied.

Contexts and Meanings

The same kind of cultural questions must be raised with all the more force when we begin to think of particular educational names, structures and functions. "Middle school" in the United Kingdom is certainly not the same thing as a "scuola media" in Italy. Neither of these things is the same as a "mellemskole" in Denmark. A "mittelschule" in Germany differs once more, and is indeed different from a "mittelschule" in Austria. A "high school" in the United States is not an English "high school" as found in Leicestershire; neither of these things is like a "hohere schule" in Germany -- much less like a "hochschule". To reach their meaning, and still more their local significance, we must know and analyze the cultural context.

These extreme examples of difference in the significance of words which might have the same translations can be deprived of much of their difficulty by clarification or the use of an effective glossary. Yet even institutions with the same age range, and ostensibly the same purpose, exercise a different social and economic role in the countries to which they belong. Alternatively, the same general functions of a social or economic kind are undertaken in quite different institutions as we pass from country to country. Where and how is moral or civic education taught? Which is the prestige institution? At what level and in what context do we expect to find efficient work in mathematics or physics? What role does the teaching of foreign languages play in the life of a school or a country, socially speaking or educationally? Is a course on business or automobile engineering a sign of modernity in the school or of dullness in the children? The answers to questions like these, which crop up with increasing frequency when we stray away from relatively neutral subjects such as mathematics, is to be found in the function of schools in a particular social setting. Indeed, some of the comments and interpretations offered by writers in the IEA study, and in its presentation to the public, are based not upon the formal evidence empirically obtained but upon the cooperating scholars' awareness of contexts and their emphases. Therefore the next stage in our clarification of terms or meanings must be solved by some preliminary analysis of functions.

A Profile of Functions

What we are really talking about in our comparative analysis of educational practices and needs in various countries or contextual settings is not institutions or forms, but functions. These functions can be considered separately for particular short-term purposes, like an IEA study; yet in the long run they must be seen not separately but as clustered in a profile. Let us take just one example.

The apparatus intended for identifying excellence and for accelerating school progress (however defined) may be one of the following:

1. a series of examinations, perhaps in sequence at intervals throughout school;

2. a parallel but segregated system of privileged but separate schools;
3. a series of extracurricular or paracurricular provisions like those provided for Soviet youth, perhaps with appropriate competitions of their own;
4. a series of in-service opportunities or transfers later in life, etc., etc., etc.

In considering any of these aspects one has to bear in mind some important questions; for example, the level or age at which competition and selection take place. Is it mild selection as in the differentiated papers offered by the New York State Regents' examinations, or intense selection as in the European tradition (followed by the rejection of a large number of candidates)? Here again one must consider particular cases like that of Japan. The extremely high mathematical attainment of Japanese children before the age of 15 may well be explained by impending competition. American example has popularized in Japan the idea of an unselected flow of children from the elementary school into what corresponds to the junior high school; but at the end of compulsory schooling (at the age of 15) there is intense competition to get into the Japanese equivalent of the senior high school. Nor is it a matter of getting into just any of the public senior high schools. The particular senior high school one attends may be remarkably predictive of future success in admission to institutions of higher education, into a career, into a particular firm's employment, with all that entails for marriage, insurance, pensions, and indeed the whole pattern of future life. Therefore, 15 is a very critical age; and the 18th year is the period of the examinations inferno which will affect a whole life more than anywhere outside Japan.

In fact even this information is insufficient to explain the intensity of Japanese interest in education. It must be remembered that admission to the topmost jobs and universities is largely influenced by progress through highly preferred schools (usually private, but sometimes public), admission to which may depend upon a series of unofficial selective processes starting with admissions tests even to the kindergartens which precede the preparatory departments of favored elementary schools. Japan must be the only country in the world with highly selective procedures at this level! Without this kind of background knowledge, extreme in Japan but important elsewhere, it is impossible to understand the functions of a particular item of the curriculum, of a particular school, or of parental attitudes.

General theories of widely observable trends may not apply at all significantly in particular cases. Nor whould it ever be supposed that any particular case is monolithic. It is usually part of a whole tangle or complex of culturally interdependent factors. In Japan it is equally important to remember the distinctive political attitudes and special educational commitment of a very large number of Japanese teachers, and the equally important but different committedness of the Japanese Ministry of Education in many matters. These certainly influence achievement and dedication quite as much as a formally well-prepared syllabus or any other device which obtains high marks in some quantitative measurement of supposed effectiveness -- such as a well-constituted "program".

These contextual question marks apply also to whatever use we make of otherwise well-established test procedures or empirical data derived from enquiries such as that of IEA. Whatever is decided about efficiency or desirability in any institution or practice, it must always be conditional upon the living context in which it is expected to operate or to secure some change.

The Ecological Context

No word, idea, practice, or institution can be studied in its real relevance outside its particular ecological context. This term is used here to refer to the setting of institutions, habits, and emotions which make up "the American way of life", "the democratic way of life", "the steady progress towards socialism in our time and Communism tomorrow", etc., etc. It is from this sort of contextual complex that all our observations are quarried. Into such a context they must be rebuilt to have any significance. Whether we like it or not, all our recommendations will be received by administrators and teachers spending about 40 years of their lives on some job. They have been trained in institutions already set in their ways; they go on living their lives in a series of cultural idioms, each one of which is no less forceful than the linguistic habits of those who speak a particular tongue. Therefore no finally pure or objective survey can be made; no neatly detached clinical diagnosis can be achieved; no nice neat recommendation can be made with any assurance that it will be understood or accepted.

The Developmental Stage

Following from the observations just made it is clear that the ecological setting includes also the notion of a developmental stage reached by the country's socioeconomic and cultural complex as a whole, and by the school system in the midst of it. It is worth repeating once again that the reforms of French education after 1959 very closely resembled proposals made soon after World War I, repeated again in 1946-47 by Langevin-Wallon, but objected to in those two instances because they were considered to be materialistic, unintellectual, and tending to lower standards. In 1959 they were forced upon the French people by the devout, conservation, and highly "intellectual" General de Gaulle. The state of France was such that educators had to accept him and his package deal.

In any case it is worth noting, even while we consider France, that the same general reconstruction of the secondary schools structure and programs has been taking place in Italy, Sweden, Denmark, England, and a number of adjacent countries. This is not because of conversion to educational ideals, but because of changes in the occupational structure, the teaching profession, and the social expectations of parents whose children stay longer and longer in school. In all cases the state of general developmental readiness (as well as contextual aptness) is a vital factor in our observations, hypotheses, procedures, and recommendations.

Priorities

The word profile above was deliberately used to indicate that some features stand out more than others. In any country certain preoccupations come to the fore, depending largely on what seems to be most necessary and desirable, and on what the local resources are. In any case legislation, budgeting, available manpower, the proportion of children in relation to the whole (as for example in places where children of what Americans would consider to be school age make up roughly half the population), all these things make up the present profile or crisis in which certain educational projects seem locally to make sense and all other possibilities nonsense. Nearly half the world's population (the half most needing education) lives in countries where the per capita income is less than $75 a year. Such people have a very stark sense of priorities.

Local and Recurrent Aspects

Part of the responsibility of comparative education is to be sensitive to these local educational factors reinforced by insights and information from economists, sociologists, and from students of politics and religion. Students of comparative education have studied crises of educational decision cross-culturally, and are able to give provisional guidance for the future. Moreover, the data relevant to education have been studied by scholars in comparative education in exactly the same way as economic data have been studied by economists. There is an immense body of carefully documented educational literature and field observation to draw on. For sociologists, economists, politicians, and others to pronounce upon educational possibilities without reference to this corpus of scholarship and craftsmanship is no less arrogant (and possibly disastrous) than the claims of teachers to take over government or the world of business.

Though the work of comparative education has transcendent aspects, every decision of any significance in education takes place within a sense of conviction which is local, topical, and more or less consistent ideologically. Education is always "our education". Thus nothing new can be implanted without a sort of grafting process in which a fusion takes place between the native stock and the engrafted scion.

However, the most important single feature of our times is the vast amount of change. The most important feature of education today is its relation to technological, social, and international change. There are no reliable signposts from the past or any universally acceptable authority. Thus comparative studies are more vital than ever.

The Study of Change, and Prediction

A very important element in all sciences, not excepting the social sciences, is the matter of prediction. From the earliest systematization of sciences, researchers have endeavored to establish "laws". It was an early methodological ambition to produce unchangeable laws. The local and topical strategy of decision for schools is everywhere linked with laws, budgeting, manpower considerations, and the sense of international or local relevance. What the schools do depends upon, and will in turn affect, events.

Unforeseen events like a war in Vietnam, the hydrogen bomb, a sputnik, a new source of food, or a new kind of contraception or disease, have profound cultural, and therefore educational, effects. They bedevil mechanistic prediction. The educational predictors of the early twentieth century took little account of the rise of suburban living in consequence of the automobile, of the consumer world in consequence of mass production and distribution, of alterations in marriage patterns and juvenile expectations, and so forth. Hardly anyone so far has been able to direct effective attention to the problems of automation. No matter how efficiently we may calculate trends, the processing of data for computers and other aids is hampered by the simple fact that we do not certainly know what questions to ask, and therefore how to arrange the material for calculation.

Furthermore, we cannot overlook the fact that nowadays information and knowledge are not merely acquired or possessed; they are manufactured with increasing rapidity, in some departments at a rate which doubles scientific and scholarly information every five years or so. The mass of human knowledge is variously said to double every 10 or 25 years. The point is that we may just as well make up our minds that, when we have done our very best, the shape of the future is still unknown, so that all the predictions and recommendations we make need constant re-evaluation. That is one more indication of the need for comparative (rather than "definitive") or "predictive" attitudes and methods.

As an indication of this expansion of knowledge let us take the study of the economics of education. This very new field of study (in any systematic sense) has already expanded so fast that Mark Blaug's (1966) bibliography lists 792 titles of books or papers. Bibliographical notes attached to these make it clear that most of the items are either factually informative or else concerned with hypotheses attempting to show cause-and-effect between input and output in the economics-education relationship. This hypothetical relationship is still wide open for study. The 1965 World Year Book of Education on the education explosion contains some skillful writing on the subject of economics and education, not least the articles by Mary Jean Bowman and by Diez Hochleitner on educational planning. These, however, and related writing elsewhere by A.H. Halsey, show that the study of economics in relation to education does not produce mechanical predictions. It is essentially an informative and analytical study intended to serve each local or topical crisis of decision, without necessarily being able to predict results or even to point to a cause-and-effect relationship. The same is true of every branch of social study or science brought to bear on educational decisions.

What do we conclude therefore? That more and more information of many more kinds is necessary. More academic studies become mutually complementary in the analysis of any one problem. That is to say, they become more and more comparative. After much preparatory study by scientists and scholars, the information and emotional and political readiness of the general public are very necessary before decisions can be reached and implemented. Some overhaul of the public apparatus of educational decision-making and of action may be called for.

Levels of Comparative Education

It is quite clear that the communication of comparative information relevant to education must take place at very different levels and in very different circumstances. We may say that our initial responsibility is to communicate to everyone (child, parent, teacher, politician) the relativity of all their assumptions, and the probable relativity of all that they do. Certainly the notion of complementariness must be brought home. So must the acknowledgement of revisability, if not the necessity for revision in due course.

Alongside this and inseparable from it is the sense of enquiry. Naturally, this entails preparation for effective empirical enquiry, practical programs, and reconstruction, as well as academic enquiry of a more intellectual or social kind. All teachers and all other relevant persons need to be prepared for readiness to cooperate with others, and constantly reminded of this necessity.

Rather than burden the reader with exposition I suggest a possible progression of levels in comparative education, within a tabular framework:

1. Informative-analytical levels in comparative education:
    - a. In the initial training and education of teachers;
    - b. In the in-service training and professional life of teachers, especially in connection with school-based or school-oriented enquiries;
    - c. In the feedback of information from school and other educational activity into the public area of information and decision;
    - d. In providing information or hypotheses for systematic academic researches such as the IEA project, or Schools Council work in Britain, or other ventures undertaken by responsible bodies.

(Clearly all these interests and activities are closely linked with the ordinary life and preparation of teachers.)

2. Problem-analysis for research, as in universities and other centers of preparation for higher degrees.
3. Inter-disciplinary cooperation of scholars in concerted projects organized within national boundaries or internationally, presumably in order to clarify important areas for public decision.
4. Follow-through commitment to the support of programs of reform or development in consequence of such decision, by bringing in relevant experience and insights which may make implementation more effective.

It is as well to reintroduce a cautionary note on possible shortcomings of researches and researchers. A major problem is that of background awareness. We suffer from the narrowness and incompleteness of our own disciplines. Moreover, though we may be trained and logically objective in relation to our own disciplines and work, we nevertheless suffer from imperfect training for the new responsibilities facing us as soon as we cross the familiar frontiers of our daily lives and preoccupations. This is rather like carrying the doctrines of the Oedipus complex into a polygamous society, or like legislating for rice-growers from some skyscraper laboratory.

Even so, our chief handicap is not so much the wrongness of our thoughts or information as the incompleteness or partial relevance of what we say. We may not have asked enough questions. Our questions may have been the wrong kind. We may not have asked them in the right conjunction. The logical stages of our enquiry may have been flawed; the hypothesis may have been amiss, some vital ingredient left out, some interpretation may have been idiomatically out of tune for the country or situation under review. When dealing with other human beings, the object of our study is an artifact of social institutions and long standing habits, and we ourselves are not disembodied spirits, but engaged subjectively upon an enquiry subjectively construed.

Suppose we take the productivity of universities as an example. Which universities are we talking about? Are the universities in that country uniform in standard, size, social prestige, job outcomes? How do they compare with universities of other countries in any one of these respects? Is a doctorate, for example, the first university degree as in Italy? Is it the basic requirement for a teaching post in a college? Or is it a mark of rare distinction, as in Scandinavia? Are we talking about quantities of degrees or varieties and qualities? Are we concerned with present appropriateness to population or appropriateness to job needs in the future? And so we could go on.

A Few Tentative Conclusions

So far from repudiating the possibility of more systematic enquiry of an empirical kind into education itself, or into the external relationships of education with national and international life, I believe very strongly that such endeavors must continue to be made with increasing force. Indeed I believe most earnestly that such concerted enquiries of a scientific kind must continue to be made with an increasing sense of public commitment and purpose. As individuals and political beings, we should be conscious of our private purposes. Even as scholars we are bound to acknowledge that our researches are oriented towards public life and other people's decisions. Others will certainly make use of our findings for the solution of social and political problems now challenging them with increasing urgency. If they do not use our findings, they may arrive at hastier and less reliable conclusions of their own.

In offering a statement of the activities and present possibilities of comparative education I am far from claiming that it holds the key to all the problems which face educators and citizens today. At the same time I do believe that it is itself one of the most central fields of research, and also one with much to offer to other specialists in sociology and economics who are now working on educational problems. It offers information and insights to them in exactly the same way as it derives information and insights from them.

Comparative education by its very insistence on comparison emphasizes the interdependence and relativity of all perceptions, all data, and all hypotheses. It reminds scholars that each one of their academic abstractions must be related to a particular context. We undertake a depth study into a culture with a deeply rooted life ot its own. In addition, and without violence to that concept, we look for cross-cultural and cross-disciplinary phenomena. Comparative education has a mass of relevant information already sorted out.

At the practitioner level, comparative education has its own methods of teaching, its own kinds of data storage, processing, and retrieval. Unfortunately, these have been handicapped by limitation to mainly pedagogical purposes and to courses in colleges of education. Comparative education's information and skills, substantial though they are, have been hitherto mainly contained in books, courses, and institutions established for purposes other than those which face us now.

The big difference to notice now is the commitment of comparative education.

Experts in comparative education know their own limitation, and a kind of "treason of the clerks" has prevented them from sharing in responsibility for providing information, insights, and apparatus for public decision. The nascent sense of public service needs reinforcement. In the future, comparative education needs to be better institutionalized, systematized, and more fully supplied with scientific information and techniques from outside. Continuous interdisciplinary conferences of scholars are obviously needed.

But that is not enough. Within each country a kind of educational council needs to be set up in order to supply information and analysis to guide the formulation, recognition, and communication of national policy for education at all levels. It goes without saying that any such educational council needs information of an international kind, not just gathered piecemeal at international meetings of teachers, administrators, ministers, and the like, but through an international constitution of some kind bringing all these activities into more sustained and methodical communication (King, 1967).

Comparative education societies have been established for some of these purposes, but for the most part they are rather specialized institutions mainly concerned with those who teach or are preparing to teach comparative education. There is still a lot to be done in relating comparative education to the other areas of public information, decision, and implementation.

A further responsibility is to help train those whose work nowadays takes them into areas of major regional development as UNESCO experts, or as people concerned with the growth of the European Economic Community, the international civil service, the international acceptability of university and professional qualifications, and so forth.

No matter what any conference concludes, or what any formalized cooperation can achieve, the horizon of uncertainty will create an infinite range of points at which the only clue to any solution will be based upon a comparison of questions, insights, resources, and experiments.

The IEA Study of Mathematics (perhaps the most disembodied school subject of all) has already revealed some of these complications. As we move from the neutral field of mathematics into the cultural fields of mother tongue, civics, and the like, the more clearly we shall come into the field which comparative education has made specially its own.

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III

THE REFLECTION OF SOCIETAL CHARACTERISTICS WITHIN THE SCHOOL

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The Culture-Personality Approach

We conventionally envisage culture as "an external environment uniformly perceived by and pressing upon" members of a given society or of some sub-population (Wallace, 1952). This influence elicits uniform behavior or at least uniform propensities toward it even if overborn by circumstances. Standardized child-rearing practices commonly are assumed to be an intermediary link. One would infer that in some sense all members of a society have the same basic personality structure. Workers in this mode have commonly assumed that "the psychological coherence of the individual personality was isomorphic with the psychological coherence of the culture" (Inkeles & Levinson, 1954). But we know that behavior in any society ranges from what is almost invariable to the highly variable: universals, specialties, and alternatives. As Hanks (1949) puts it, "the items of behavior with less variation will be more institutionalized, more nearly continuous or permanent historically, and more socially functional".

The sources of information about the more pervasive elements of a culture are often distinguished as cultural products (folktales or art forms -- or even IEA math scores), cultural themes, modal personality, and so on. We are seeking some sort of fundamental propensities or configurations that will enable us to predict outside the specific sphere of activity in which the observation was made.

However, a point of special pertinence in the study of pupil behavior, emphasis among the members of a society upon the same goals need not be matched by equal agreement or acceptance of particular means, and vice versa.

A Search for Explanations of National Differences in School Achievement

The mean mathematics scores for national samples of 13-year-old pupils in the IEA study (the exclusive subject of this discussion when not otherwise indicated) ranged from 16 in Sweden and the US to 31 in Japan. The Japanese mean is .75SD and that for Belgium .50SD above the grand mean of all the countries. By contrast, Sweden and the US are about a third of a standard deviation below the grand mean. But dispersion among individual scores is large within every country. It is largest for Japan and England (dividing individual country SD's by that for the composite of countries); Sweden and Finland display low dispersion; the US is intermediate.

If the countries studied had been more heterogeneous, representative samples in economically advanced countries would score highest. Since in the particular countries we tested pupils at an age when all children are in school, we ask whether there is some set of characteristics of Japan as a society that will explain why Japanese pupils on the average score far above those in Sweden or the US.

The mean scores of 13-year-olds could be correlated with innumerable measures commonly used to rank nations. The IEA countries are in no sense a sample, and analysis is limited by the few degrees of freedom when independent variables are country means; to use rank correlations risks interpreting slight absolute differences as diagnostic. One could use factor scores for trait clusters, but the factor analyses discussed below do not suggest that this would be a promising procedure for this particular set of countries. Instead, in the present analysis I have the less refined but adequate procedure of comparing nearly 200 scattergrams. I grouped the items into two broad clusters: 1) economy, communication, and overall achievement motivation and 2) features of the educational systems (Russett, 1964).

Economic Variables

Between 13-year mean national scores and per capita GNP the relationship is clearly negative; much of the effect derives from the high US and low Japanese incomes, for among the remaining countries it is only weakly negative. (Belgium has too high a score for its level of GNP, so to speak.) Levels of steel consumption and of energy use similarly display negative relationships, as does proportion of wage earners among the population. There is no clear relationship with proportions of the labor force employed in either agriculture or industry. The loose positive correlation with wheat yields per hectare perhaps indicates that efficient farming prevails where pupils do well, but high area yields (as against high yields per worker) are not usually taken as indicators of economic efficiency.

Suppose we look instead at some intellectual-communication indicators. The ratio of telephones to population shows a slight negative relationship (even omitting the US). Newspaper circulation, patronage of cinemas, ownership of radios, and supply of physicians have no clear correlation with math scores as among countries. The number of book-titles published annually manifests a rather common pattern among these countries; Sweden is high but the US is low (both score low on the tests); high-scoring Japan publishes few titles, as does France (third from lowest mean score), while the Netherlands and Finland have intermediate scores and publish many titles. (With scores of the pre-university students specializing in mathematics, if one omits Australia and the US, the relationship with number of book titles seems to be weakly negative.)

One could hypothesize that pupils' performance in mathematics would reflect the technological character of a society. But the proportion of book titles that are in science and technology is weakly correlated with the 13-year scores (and unrelated to preuniversity scores). The same pattern emerges for the proportion of university students who are enrolled in science and technology. The actual employment of technologists (in ratio to population) on the other hand, seems to be negatively correlated with each set of scores. (On this index data were lacking for several countries. These employment ratios tend to be higher in the high-income countries.)

The proportion of government expenditure devoted to education displays only a weak positive relationship with 13-year and secondary scores. The proportion of total GNP absorbed in government revenue is also uncorrelated.

Perhaps the inter-nation differences in math scores reflect varying sex differences in performance. The superiority of boys is largest in Belgium, intermediate in Japan and Netherlands, and least in Sweden and the US. The proportion of wage-earners who are women shows a slight negative relationship with the 13-year scores (but none with the preuniversity scores). Scores are unrelated to salaries of female teachers measured against salaries in other occupations. There is a tendency for scores to be highest where women are a smaller proportion of university students.

Communication Variables

Since mathematics, of all school subjects, is presumably least affected by national culture, we can examine some indexes of international communication. The proportion of book titles that are translations from another language, for example, is not correlated with the 13-year scores; the relationship is weakly negative if one omits the US, which translates few. Foreign trade as a percentage of total GNP displays a definite positive correlation (omitting Japan), though Sweden ranks higher on trade than it should in terms of pupils' scores. There is a weak positive relationship with the ratio of foreign mail to population when we look at scores of the preuniversity mathematics students, but no correlation for the younger group.

Achievement Motivation

There have been high hopes in many quarters that McClelland's or some other index of achievement motivation would prove useful in identifying important features of national life. Yet for the IEA countries, out of the five with the lowest 13-year scores three are high on the achievement motivation index and the two highest countries on the math test are lowest in motivation. The relationship is more mixed for preuniversity scores: weakly positive if one omits three countries displaying a pattern opposite to what one would expect. Perhaps diligence in school is really contra-indicative for achievement more generally.

In passing we may note that citizenship activity as reflected in voting rates has no clear relationship to the pupils' scores at age 13, though it does have a weak positive correlation with the scores of secondary students.

School Variables

We can now take up some indicators about schools in the several countries. The scores for 13-year olds tend to be lower in those countries with larger proportions of the age cohort enrolled in the final year of secondary school. Preuniversity scores, as we would expect, are negatively (but weakly) related to the ratio of university students to population.

Moving still further into the educational system, it is the low-scoring but high-income countries that have the lower proportions of teachers who are males. However, the proportion of young teachers reveals no relationship to scores. Those countries score highest whose teachers feel the least autonomy in their work. The proportion of teachers with longer post-secondary schooling is unrelated to 13-year and negatively related to preuniversity scores. Using normal schools to prepare elementary teachers seems to bring higher 13-year scores, but among secondary pupils non-normal training of teachers is associated with the higher scores. It is the low-scoring countries that have provided the most in-service training for math teachers.

The 13-year olds score a little higher in those countries where pupils report more liking for math and for school generally, but a view of math as process and as easy to learn is more characteristic of pupils in the low-scoring countries.

A salient finding was that mean scores are positively associated with the level of the mathematics curriculum put before the pupils. But this brings us back where we started: why do some countries expect pupils to learn more math and succeed in inducing them to do so?

National Yield

Using aggregate country indexes, then, there are few definite correlates of the pupils' scores. But 13-year olds are a long way from adult use of mathematics. Moreover, the countries differ greatly in the proportions of their population who persist in school to the gate of the university, whether they do or do not take mathematics seriously in secondary school. It was in the light of that circumstance that the IEA group attempted to estimate overall yields of mathematical competence in the population at large. As a first step the mathematics means were computed for identical proportions of the age cohort in each country. Since Belgium had only 4% of the cohort in pre-university math curricula and Netherlands only 3% for the preuniversity non-math curricula, corresponding proportions of the age cohort were taken in all countries from the top scores for each test population. These means were much closer together than for the actual student samples.

The second procedure was to use the composite distribution of preuniversity scores for all countries combined, and then compute what percentage of the age cohort in each nation reached given percentile points on that distribution. Again, inter-country differences are narrower than for the unadjusted scores.

It will be of interest to review rapidly the correlations between these percentages of the age cohort reaching the 90th percentile on the composite distribution and some of the indexes of national characteristics.

The relationships with indexes of economic level (per capita GNP, distribution of the labor force, etc.) were essentially zero, as was also true for the index of achievement motivation. The relationship with newspaper circulation was weakly positive but absent for number of book titles published or rates of voting. The relationship was zero also for the proportion of book titles in the field of science and the ratio of university students to population, but it was positive with percentage of women among university students. There was no relationship with pupils' attitudes about mathematics and none with teachers' characteristics, except that this index of math achievement was higher where teachers had more sense of autonomy.

This long if superficial exploration into national characteristics does not encourage hope that we will soon be able to offer much explanation beyond what has been supplied in the IEA report as to why pupils in some of these countries seem to learn more mathematics. A perhaps surprising proportion of the relationships actually are opposite to what one would anticipate. Specifically, the more technological (among these not very dissimilar countries) tend to have lower math scores. Yet we know that if we made a similar comparison of the provinces or regions within any country, pupils would score higher in those localities displaying the most economic and cultural development.

Nor are these findings due to the limited diversity among a particular set of countries. If we examine the Harbison-Myers (1964) correlation matrix for about 75 countries, we observe that per capita GNP is only slightly correlated with the proportion of national income devoted to education. In the prosperous countries a larger proportion of the workforce are scientists or technologists, yet the proportion of university students enrolled in those subjects is not related to economic level. Moreover, these two indexes of technological emphasis are negatively correlated. In accordance with the IEA data, employment of technologists is positively correlated with the proportions of youth reaching the higher levels of school, whereas emphasis on science among university students is not.

Virtually all the items used in this statistical exploration are composite or aggregate indexes for the society as a whole. No doubt each item indicates roughly a force making for emphasis upon mathematics and generating motivation among pupils to demonstrate competence in mathematics, comparing one country with another. However, the correlations reviewed alert us to expect many unanticipated relationships. Moreover, as the IEA study shows, intra-nation and inter-school variability are large in every country. We have, then, to search for some method of measuring how national characteristics become embodied in the actual activities of schools and in the motives of individual pupils, or at least of various categories of pupils.

Opportunity Perceptions: The Social Mobility Factor

Wherever there are schools in the world, a salient motive for remaining in school longer and for attending a better school than do other individuals is the anticipated reward in the form of status obtained or maintained. For women a corresponding consideration is mobility through marriage as well as their frequent social role of cultural adornment. Strictly "cultural" motives for schooling are not salient for many persons except those with assured status. Actually the assurance of high-status occupation as a reward for advanced schooling is commonly exaggerated, but what people believe to be true is important. In industrial societies there is additional impetus from the evolving technology for rising levels of schooling. Over time, successively lower social strata, assimilate aspirations for advancement through education.

Vertical Mobility

One might then expect that performance by school children would reflect the relative national rates of vertical social mobility even though wishing to persist in school is not identical with determination to perform at one's maximum level as a pupil. *A priori*, the relationship of vertical mobility with school achievement is not unequivocal, however. Mobility opportunities could arouse incentives to work hard in school, thus giving a rise to a positive correlation of mobility with test scores. But high rates of mobility also mean that many individuals do not receive the usual complementary stimulation within the home, which would tend to create negative correlations of scores and mobility. Exploration of this relationship is hindered by the ambiguous or equivocal nature of mobility indexes, defects of measurement and non-comparable rubrics aside.

Miller (1960) computes three simple indexes, and we may explore the relationships of each with the IEA findings. The percentage of men originating in manual-labor categories who attain non-manual occupations is their measure of upward mobility, and the contrary rate measures downward mobility. They also use the proportion of men originating in non-manual strata who remain there divided by the manual-to-non-manual flow as a measure of the scarcity of mobility opportunities. These three indexes for most of the IEA countries are given below (Table 1).

Table 1. Rates of Vertical Social Mobility for Selected Countries

Countries	% of Manual Who Enter Non-manual Occupations	% of Non-manual Who Enter Manual Occupations	Index of Non-opportunity
Australia	24	37	2.6
Great Britain	25	42	2.3
Finland	11	24	6.9
France	30	23	2.5
Germany (FR)	20	29	3.6
Japan	24	30	3.0
Netherlands	20	43	2.9
Sweden	26	28	2.8
United States	29	21	2.8

The downward mobility rates are as high as those for upward mobility, and the former vary more among these countries. High upward combined with low downward mobility characterizes France and the U.S.; the Netherlands shows the opposite pattern; England is high, Finland is low, and Japan is intermediate on both rates.

As with other characteristics, these mobility rates can be plotted against the 13-year math scores. There is a very loose negative relationship with upward mobility, though either Finland's mobility is too low or that of Japan too high to make a neat pattern. Even so, low-scoring U.S. and Sweden have relatively high upward mobility while Japan is below the median level. For downward mobility related to math scores, there is no clear correlation. Downward mobility in the U.S. is low while for Sweden and Japan it is intermediate. On the index of non-opportunity the range among countries is narrow, except for Finland, but the relationship to scores is only slightly positive. That is, the countries scoring high on the 13-year math tests display more rigidity at the boundaries of the upper strata, and Japan is most rigid after Finland.

These rough correlations do not suggest any relationship between mobility opportunities and diligence in school work. But, as remarked earlier, perhaps mobility is not a very real aspiration for such young children. So let us then examine the pre-university math students. With upward mobility rates their scores show a distinct negative correlation across countries. On the other hand, high math scores go with higher downward mobility rates. (For pre-university math students the index of non-opportunity shows no correlation.) Shall we then conclude that more plentiful opportunities to rise in social status discourage diligence in school while struggling to stay in the upper stratum encourages diligence? That may be the situation, but few would have constructed that line of reasoning in advance.

But how really should one define opportunities? For rates of upward mobility

Japan is intermediate, Sweden a little higher, and the U.S. highest; this order corresponds to the proportions of the age cohort completing secondary school. On the rates of downward mobility, the U.S. is lowest and Japan highest of the three. The country keeping more youth in school has high upward and low downward mobility, and contrariwise. But if we plot the upward mobility rates aginst the percentage of the age group completing secondary school for all countries there is no relationship: in retention the U.S. and Japan are divergent from the other countries. Plotting downward mobility rates against retention, there is again little correlation. The U.S. and Japan diverge on retention, the U.S. has lower downward mobility whereas it has higher upward mobility than Japan. The index of non-opportunity also shows no relationship to retention, but on this index Japan, the U.S., and Sweden are similar.

Social Selectivity

Perhaps it is not so much a question of how many youth finish secondary school, but of who it is that finishes. Using an index of the social selectivity of secondary enrollment, the U.S. and Japan are rather similar while Sweden with Finland is intermediate. The correlation of this selectivity index with the rates of upward mobility is if anything negative: the upward mobility rates are about the same irrespective of status selection in secondary school. (Germany, Netherlands, and Finland have far too low mobility if Sweden, France, and England be takes as setting the pattern.) Relating school selectivity to downward mobility rates, the U.S., Japan, and Sweden display a neat pattern: the more select a country's secondary students in terms of paternal occupation, the higher the rate of downward mobility. Leaving out the two least selective systems (U.S. and Japan), among the other IEA countries there is no association with either upward or downward mobility. Notice also that at equal rates of social selection for secondary students, France and Finland have low downward mobility, Germany is intermediate, while England and Netherlands are high. The social mobility rates do not display any marked or consistent correlations with national rates of retention in school, with social selection for secondary school, or with math scores of pupils.

If one is thinking in terms of effective inducement to diligence in school, would one indeed pick inter-generation mobility as a salient factor? Or would one emphasize statistical chances to remain in school through secondary years? Perhaps knowledge that secondary school places are not closely held by the social elite is more effective. After the fact, one could justify each of these indexes, but it would be difficult to choose among them in principle.

It is said commonly that in a less differentiated or simpler society it is difficult to be mobile on any single dimension of status (Smelser & Lipset, 1966; Anderson & Bowman, 1951). Where achievement criteria of status are stressed,individual mobility (as distinguished from mobility of a whole sub-population) is regarded as more attainable. But among the IEA societies, we can hardly say which is more differentiated, except perhaps that Israel is least so, or which is more achievement oriented. To attempt to resolve this question by relying upon the indexes of mobility would be to reason circularly, even if one ignores the problem of how to combine upward and downward mobility rates. Most people would rate England and Netherlands as comparatively rigid societies. Yet, both have high rates of non-manual to manual mobility; Netherlands has low upward mobility while in this respect England is intermediate.

Conceptualizing the Nation as an Integral Educational Milieu

Since the foregoing crude correlations of mean 13-year math scores with national characteristics yielded few relationships, one is tempted to think that some kind of composite of national traits might prove more informative. Availability of computers has facilitated mass processing of data for countries, permitting identification of clusters of nations and clusters of traits. Thus Sawyer (in press) was able to encompass 40% of the variability among nations on over 200 variables within three factors: total population, aggregate GNP, and western-oriented polity. Each of these factors displayed different correlations with individual national traits. Thus total population is correlated with total exports and with books published. Total GNP is negatively correlated to proportion of labor force in agriculture, positively to the proportion in industry and to industrial output per worker, to newspaper circulation and book titles published, to foreign mail in ratio to population, to school enrolment rates, and to proportions of pupils who are girls. Need-achievement indexes and proportions of government expenditures for education, by contrast, are not clearly related to any factor.

Banks and Gregg (1965) identified five factors in polities. The "polyarchic" factor was most important, and all of the IEA countries are quite highly loaded on it. An "elitist" factor came next, but it was not conspicuous for any IEA country, nor were the "centrist," "personalist," and "traditional" factors. While these factors can be useful for categorizing the diverse societies of the world, they do not help in our present venture. One cannot be confident that they would be related closely to school achievement even if we had included many countries.

Cutright's (1963) political categorization of nations is a little more relevant. He found communication factors to be more highly correlated with his index of political development than was economic development. For the US, Belgium, and Germany polity and communication were rated as about equally developed; for Australia, France, Sweden, and England the political index was relatively higher; for Japan, Finland, Netherlands, and Israel development was greater on the communications side. But one can hardly tease out much interpretation of the IEA results from these findings either. Nations or societies are extraordinarily complex systems, and it is difficult to categorize even primitive societies, although LeVine and Sawyer, (no date) identified three main dimensions among primitive societies: economic, family, and polity (or stratification). These are not closely correlated, nor are the specific items falling under any one of these rubrics.

National Character

Having gained little enlightenment--except clear warnings against assuming seemingly obvious relationships--from correlating pupils' scores with various objective national indexes, one would hope to find more subtle indicators of what is sometimes called national character. The voluminous research on this topic has not been productive. It will suffice to summarize a few conceptions and to emphasize the reasons for disappointment with this line of thinking.

"National character refers to relatively enduring personality characteristics and patterns that are modal among the adult members of a society." (Inkeles, 1961). It may be conceived as "institutional pattern" by other writers, as "cultural themes," or as established patterns of values, of attitudes, or of behavior.

If there is a distinctive national character, a distinctive common culture, we must identify those features of the particular culture that give rise to the specified "character." As Mandelbaum (1953) puts it, we are interested in distinguishing a provincial organization of personality from generic human aspects. Even if we can delineate distinctive behavior that is more frequent in one society and that is patterned in a distinctive way, there is a profusion of causes, historical or contemporary, generating that singularity. Which of them lie behind the particular distinctive characteristic in which we are interested? Moreover, a nation or state is a political or legal unit that in most cases only roughly corresponds to the boundaries of a culture. And within the bounds of the culture or nation, the component elements are not displayed equally in each region, or their configuration varies. We then have to identify what culture or sub-culture is determining the behavior of particular sub-populations. It is not too informative to go further, as some do, and assume that the national character is a codification of demands from the culture upon the participating members. Finally, the identified character must lag behind the culture in time due to the spacing of generations, and this lag will differ as among the subpopulations or strata of the society.

It is not too difficult to understand the transmission of a local culture among people living in rather isolated circumstances, for communication is always heavily concentrated. Culture is transmitted or character is learned, maintained, and reinforced by complex patterns of communication. It is not so easy, however, to understand how a nationwide culture has come to pervade the population of a given area. We may think we perceive how attachment to national political figures, practices, and symbols becomes established. In the economic sphere we daily observe how consumption patterns are homogenized (but also differentiated) by advertising and merchandising practices and by face to face communication. Turning to schools, we understand that a broadly similar set of habits about reading, figuring, and so on are diffused nationwide through the schools. But we do not know how it becomes established that levels of performance in these school subjects will be relatively high or low in one society as against another, nor very much about why these levels vary widely among the geographic subdivisions of a society.

In explaining national differences in math scores we cannot rest on Mead's (1953) method: to focus upon a fact of behavior and its linkage with other behavior. Rather, we must look at what she was less interested in: the frequency distributions of behavior. We have constantly to raise the question of typicality, for it is diversity that impresses us as much as uniformity. There are a range of personalities and multiple themes.

We are not much ahead to agree with Opler that shared values determine the selection of means for their achievement or that it is selection of means that gives style to a culture. This integration or consistency among the elements embodied in the themes is what it is so difficult to identify. And it is even more difficult to put either single themes or configurations of them into a casual connection with, for example, the performance of school pupils. Most descriptions of societal themes have focussed on rules of deference or authority, kinship behavior, attitudes about manipulating the environment, etc. How can we infer the behavior of pupils vis-a-vis their lessons from these very general, if basic, structural features? As Mead says, we are searching for patterns that support predictions of behavior. But it is doubtful that anyone would have predicted the order of the IEA countries on the tests.

Speaking about the coherence or integration of a culture, we can distinguish integration among normative rules. In functional terms also we see how actual behavior fits together or clashes; thus we say that the more technological societies need a higher level of mathematical competence. However, as comparison of the test scores for the actual samples with those for the equal proportions of the age cohort makes clear, while technological societies may need to know how to apply a larger fund of mathematics, that specifies little about the required level of competence among any particular proportion or sectors of the working population. Since each of the IEA societies is operating at a comparatively high economic or technological level, presumably in each of them the functional integration between the needs of the society and the distribution and incidence of mathematical competence is adequate. We cannot as yet specify any incentive or motive derivative from the society's need for mathematics that penetrates to the consciousness or personality of any particular pupils in the schools. The linkage of normative integration (as regards mathematics versus other kinds of learning) to functional integration (as manifested in the utilization of mathematics) is so elusive a problem that we cannot as yet formulate it clearly.

Elite and Social Class as Confounding Factors in Identifying National Character

The IEA study found what has been reported in innumerable investigations: pupils' scores in tests rise with the status of the father. For the countries taken together the mean score for 13-14 year old pupils rose from 21 for the lowest to 31 for the highest of four status categories. But those differences varied from about five points in Sweden to 22 in England.

These contrasts do not necessarily raise any question of national character. The gradient of scores with paternal status could vary among countries as a result of differing methods of grouping pupils. The separate English report makes this quite clear, (Pidgeon *et al.*, 1967). The international report gives considerable evidence that streaming pupils into different schools in correspondence with (if not on the basis of) parental status can inhabit performance among pupils at all levels of ability. Scores were higher if pupils were in schools with a socially heterogeneous rather than homogeneous clientele. Taking only pupils in academic programs, the status gradient of scores is rather small.

But we are brought up against the question of national character when we compare countries with respect to mean scores for each of the parental-status categories. The 13-14-year-old pupils in Belgium score above those in Germany by almost the same amount whatever the paternal status. In each status category Australian pupils fall below those in Germany by a uniform amount, and the Swedish means by status parallel those of Australia but at a still lower level. Of more interest, however, is the fact that low-status German pupils do about as well as high-status pupils in France, the U.S., or Finland. And low-status Japanese pupils do better than the high-status pupils in the latter three countries and nearly as well as those in the Netherlands.

One can put this another way. The zero-order correlation with parental occupation or schooling varies considerably among the IEA countries. For father's occupation, the correlations with 13-year scores vary from .19 to .38, for father's schooling the range is .06 to .40, and for mother's schooling from .04 to .32. These correlations are virtually the same in Japan and the U.S., despite the great difference in mean scores in those two countries. We can subdivide pupils in each country by kind of school, parental background, or many other variables and observe that within any category certain countries rather consistently have higher scores. There are national differences in performance to explain.

Some of these findings would be congenial to those who write of national character as pertaining mainly to the national elite. However, in terms of the pupils' scores, this interpretation fits England, Japan, or the U.S. better (where the gradient of scores with parental status is steep) than it does Belgium or Australia. It has been observed often that differences between elite and populace within nations exceed differences within either elite or populace between nations. In some countries the inter-status means of math scores do differ by a greater amount than the difference between the highest and lowest scoring country. But the IEA data also show the elite-mass disparity itself varies among societies and that populace in some countries excels elite in others.

This same kind of pattern has been set forth for other kinds of data as well. Inkeles (1960) points out the limitations in using cross-national correlations as a basis for inferences about total-nation indexes because of intra-nation variability and because of time lags in response of societies (or their sub-populations) to such influences as industrialism. He points out also that the social interaction between strata within particular countries can affect the level of attitude of either or both strata. Hence we can get similar directions of correlation for inter-stratum comparisons of attitudes while the overall mean or the sub-population means can vary greatly from one to another country. Inkeles demonstrates these patterns for job satisfaction, happiness, and other items as related to social status in a set of countries.

Returning to the IEA data, we must underline the fact that the correlations between scores and individual variables (family background, pupils' attitudes, traits of teachers, or school traits) vary markedly in size among the countries.

Taking all the independent variables together, the proportion of variance in scores explained was highly diverse, ranging from two-thirds in the Netherlands down to about one-fourth in Sweden and the U.S. This proportion was less disparate among countries for the selected pre-university populations.

But when we observe where among the categories of independent variables principal explanatory weight falls, as between countries, we face perplexities. Although the proportion of total variance explained is the same in Sweden and the US, in Sweden pupil interest has comparatively more influence than in the US, as do school variables, while parental variables bulk relatively larger for US pupils. Interest of pupils in mathematics was of about equal relative weight in Japan and Sweden, and greater than for US pupils, but Japan resembled the US in the heavy influence of parental characteristics. Similar discrepancies, if they be properly so called, can be found for the other countries.

Is it a feature of national character that in both Japan and the US parental factors are allowed equal play in affecting pupils' performance while pupil's interest is more appropriately manipulated in Japan but level of curricular material is allowed to be less uniform in the US? Perhaps it will prove impossible to identify any non-school traits in these countries that will explain their pupils' performance. Perhaps we must rather disentangle the intricacies of school organization, pedagogic methods, and local variations in school administration country by country.

We come closer to the elite-mass counterpoint when we analyze the math scores for the preuniversity populations. At that level the US mean was distinctively low while five countries surpassed Japan, yet the proportion of total variance in the preuniversity math scores explained was nearly the same in these two countries. At this grade level, parental variables were relatively more influential in the US than in Japan; teacher variables (especially opportunity to learn) and school variables were more important in Japan; pupils' interest in mathematics was of about equal explanatory weight in both countries.

In the countries with high proportions of the age cohort enrolled in secondary schools, average mathematics scores and the proportion of those students coming from high-status homes are relatively lower. The report estimated the increase in score between the 13-year and the pre-university year students (in the math curricula); those gains in scores ranged from 1.83 units in the U.S. to 3.16 in France. The gains were positively but only moderately correlated with the increments in paternal occupation and schooling between the two pupil populations. However, as among countries, the correlation between mean paternal schooling and the proportion of high-occupation fathers for the pre-university math students was very moderate.

This complex shift in paternal education and occupation accompanying selective enrollment in secondary school can be shown more definitely in another way. Comparing pre-university math students with the 13-year olds in Australia, the increment of paternal schooling is .5 year but there is an increment of 20 percentage points in fathers with high-status occupations. In France, by contrast, those two increments are 3.6 years and 29 points. We can then compute for each country a ratio: the numerator is the increment in percentage points of fathers with high-status occupations between the 13-year and pre-university math samples, and the denominator is the corresponding increment in paternal schooling. On this index of paternal-occupation shift per year-of-schooling shift, the countries ranged as follows: France 8, Sweden and Japan 10, the Netherlands 13, Finland 19, U.S. 20, Scotland 25, Belgium and England 27, Australia 40. It would seem that in France, for example, the social selection that accompanies persistence through secondary school focuses upon the intellectual capabilities of the children more than it does in Australia where pupils' abilities are not assessed as independently of paternal social status.

The counterpoint of elite and populace is not the same in all countries, but that feature of national life does not tell us very much about pupils' performance. Levels of school performance in the different countries are not explained by differing parental backgrounds in the systems taken in the aggregate.

Modal Personality, Attitudinal Distributions, and Child Rearing Practices

It is always possible that an explanation of the superiority of 13-year Japanese children on the IEA tests is due to some fairly routine feature of the school system that just was not included in the variable network, or was poorly identified in all of them. But there may be an educational practice in Japan that has a peculiarly tight linkage to pupils' motives; perhaps it is the reported practice of frequent home visits by teachers. Or, there may be a fundamental way of looking at the social world or of conceiving the role of pupil that elicits an added increment of performance in each sub-category of Japanese pupils, able and stupid, urban and rural, children of workers and of teachers.

In exploring inter-nation differences we do want to identify patterns and commonalities, of norms or of personality structures that underlie diverse behavioral expressions. Because we must avoid circularity of reasoning we cannot insist that some feature of social character is required by the social organization. We have to seek a configuration that undergirds a variety of behavioral situations, but if this general disposition is too general a given character type (as authoritarian personality) can support such various behavioral patterns that our explanation still remains to be done. If these fundamental patterns cannot be identified, explanations of pupil performance can be found only by more penetrating studies of schools.

As Duijker points out, the concept of modal personality refers to characteristics of particular subpopulations, and one would not expect the configuration of those modal patterns to be simple in any nation. This approach poses the problem of to what extent the values current in a culture really form part of a person, how far they resist change, and how far they are essentially personal or distinctive of a people.

The personality approach leads us to identify transituational consistency, but situational specificity is a feature of behavior not expecially indicative of personality. In the IEA context, this seems to imply that we should identify distinct patterns of pupil or of teacher behavior. We can push our exploration first into certain attitudes or values: determination to please parents, belief that the best educational opportunities can be won only by a few adept pupils, identification of self-respect singularly with school performance, etc. Finally, do these behaviors or attitudes rest in some patterns of personality that are not mere translations of actual test performance into a different language? In view of the large variance among Japanese pupils on the tests (individually and among prefectures, communities, and schools) identification of the sources of superior performance (other things constant) will not be easy.

Duijker suggests classifying attitudes (as expressions of values or themes) along three dimensions. They may vary in potency: their motivational force in daily life. Attitudes or values differ also in dominance: their extension over various aspects of life. And they vary in focality: are they ideal norms to which individuals are sensitive (as honor in Spain)?

Unfortunately, little of the work on national character or personality and culture has dealt with the kind of cognitive problems met in the schools of developed countries (Roberts and Sutton-Smith, 1962). Some of the tasks to take up are indicated by Wolf's unpublished item analysis of the IEA tests. Correlating the relative difficulty of individual test items across countries, he found that items tended to be of about equal relative difficulty for pupils in each country. The coefficients for Japan and Sweden or the US (taking countries with extreme mean scores) are not out of line with those for other countries. One infers a rather uniform mental framework among school children; a country does not have low scores because the item is unsuited to the way its children think. The absolute level of difficulty can be due to unfamiliarity with particular items, to differing opportunity to learn. Wolf's results for item discrimination (correlation of success on a given item with total score) are broadly similar to those for difficulty, but these inter-country correlations average about 15 points lower than for difficulty. On this second matrix also the coefficients for Japan are not noticably unlike those for Sweden or the US.

Whatever conceptualization we prefer--national character, themes, modal personality--we have to come to terms with the burgeoning research on child rearing practices. Socialization inculcates skills needed for later roles. Training has various future-time referents: 1) eliciting behavior wanted from the child in the immediate situation, 2) training him for the role of child as he is, 3) for the next stage in his maturing, or 4) for more remote roles. Presumably the observable differing ways in which societies rear children produce different sorts of adults.

But congruence between how children are reared and how they act when they become adults has been established for no society outside very limited segments of behavior--perhaps in none by actual longitudinal studies of the same individuals. Substituting cross-sectional for longitudinal data raises again the spectre of circular reasoning. Belief that rearing practices can be linked with adult conduct is fostered by the prevalent psychological climate of opinion. Even when both ends of the maturation scale are measured, their linkage remains hypothetical. As has been often observed, psychologists are more confident about _post hoc_ explanations of present behavior from reported or inferred childhood experiences than in predicting future behavior of children. To show that certain features of a culture (as authoritarianism) are reflected in socialization media (as school songbooks) does not entitle us to infer that we have identified the important sources of the next generation's personalities. Even when we identify a character trait for a society such as self-reliance, it is problematic as to what that trait means for actual expressions in behavior.

Study of child rearing is attractive also because it brings us closer to vernacular culture that is embedded in the everyday life of ordinary individuals including pupils. But there is a large gap in inference between varified patterns of traditional behavior and imputed motivation for present action in a specific context.

The strongest reason for caution in relying upon study of early child rearing for interpretations of national styles of behavior lies exactly in the ambiguous nature of the data. Sewell (1955) has inventoried child rearing practices. He was unable to identify a consistent pattern throughout families living in the same culture. Moreover, the practices within individual families were not consistent in terms of authoritative doctrines as to probable effects of different practices. He also, (Sewell, 1962) analyzed the psychological adjustment of young children reared in his sample families, but he was unable to establish any appreciable correlation between the child's behavior and how his parents had treated him. Precisely the same ambiguity characterizes the vast majority of studies of pedagogical practices--as true for medical practice until very recently.

Some Observations on the Case of Japan

No doubt it would have been widely anticipated that the US would come out low on the IEA tests. Despite extensive personal acquaintance with Swedish schools, however, the standing of that country was to me wholly unexpected. *A priori*, one could have set up strong arguments as to why Japan would be high or low; in any event, it is the most different country. As among the other countries, there could have been few firm anticipations or surprises.

Some of the puzzles that emerge from the IEA findings can be highlighted by rapidly contrasting Japan and the US. American fathers and mothers of 13-year pupils averaged 2.5 years more schooling than did the Japanese parents. The proportion of pupils coming from high-status homes was the same, but twice as many of the Japanese lived on farms. The correlation of 13-year scores with parental traits was virtually the same in the two countries (.25-.30), as were the differences in scores between pupils with high and low-occupation fathers (14 and 12).

Consistent with the lower enrollment rate at the end of secondary school in Japan, the shift in father's education between 13-year and final-secondary grades was 2.0 years in Japan and .4 year in the US. The points of gain in high-status fathers between these two levels of school were for the two countries 20 and 4 respectively. The gain in scores between the two school grades was appreciably larger in Japan, yet the increment in score per year of gain in paternal schooling between the two grades was larger in the US. Similarly, in the US the more modest gain in scores between the two levels of school is accompanied by less shift in the social composition of parents. The correlation of paternal schooling with pupils' expressed interest in mathematics was a little higher in Japan (.15 and .04). The urban-rural differences in scores were 8.4 in Japan and 3.5 years in the U.S. Boys excelled girls by a larger amount in Japan (virtually none in the U.S.), although the sex difference for interest in mathematics was similar in both countries. Japanese pupils took more subjects simultaneously, but an equal proportion of the time table was devoted to mathematics. Hours of total instruction per year were a little over a thousand in each country.

Japanese pupils rated the importance of mathematics for society higher, had more favorable attitudes towards schools, and more often described their teachers as using inquiry-oriented methods. On the other hand, Japanese pupils had no greater interest in the subject, and they were less likely to perceive mathematics in process terms. Japanese pupils found the subject less difficult despite a more demanding curriculum. Pupils' interest in mathematics was more closely correlated with amount of additional schooling the pupils expected to receive in Japan than in the U.S. (.46 and .32).

One-half of the American teachers of the 13-year olds but only a tenth in Japan had at least five years post-elementary schooling. Less than a half of the American teachers were males as against three-fourths in Japan. But the proportion of males was also three-fourths in low-scoring Sweden. In each country a quarter of the teachers were under age 30. In Japan three-fifths and in the U.S. one-half were prepared in a normal school. Only a quarter of the Japanese teachers but half of those in the U.S. had received some in-service training in mathematics. American teachers expressed a higher degree of freedom in their work. Taking the mean income of employed people as 100, salaries of elementary teachers were 145 in Japan and in the U.S. 114 for males and 185 for females. In Sweden the ratio was 201.

The correlation of pupils' scores with various traits of teachers was negligible in both countries, except that correlations of mathematics scores with opportunity to learn was somewhat higher in the U.S. Associations with characteristics of schools and with amount of time spent on mathematics were negligible in both countries. The correlation with interest in mathematics, however, was .42 in Japan and only .20 in the U.S.

If we look for a moment at the more selected pre-university pupils specializing in mathematics-type courses, again the U.S. ranked lowest but this time the Japanese were definitely not highest. Ten percent of Japanese students surpass the 95th percentile on the all-nation distribution of scores as against less than 4% of U.S. students. Yet, because of the higher enrollment rates in the U.S. at this stage of school, the percentage of the age cohort surpassing that 95th percentile was .65 in comparison with .85 for Japan.

Innumerable studies in the culture-and-personality vein have been carried out in Japan. A few of the findings can be referred to, though one observes quickly that the findings have only a tenuous connection with pupils' performance. The attempts to work with the supposed guilt-shame distinction are inclusive (Ausubel, 1955). Jones and Bock (1960) find the U.S. high on moderation-eclecticism; the Japanese display receptivity-self-containment. DeVos (p. 62, 1965) speaks of Japanese paternal families, hierarchical loyalties, guilt about family expectations, and absence of individualistic self-realization. Yet he also finds delinquency rates patterned similarly to the U.S. as regards urban zones, school adjustment, and other factors.

Vogel (1962, 1965) describes the rigors of the examination steeplechase in Japan, though he also emphasizes how it narrows the scope of learning. Singleton (1967) has given us a beautiful description of school life in one Japanese town, emphasizing how families and parent-school associations devote time and money to organizing cram-schools and generally goading their children to prepare for examinations. Since he concludes that scores in the prefecture he studied were the lowest of all Japan, we still have to identify the reasons why other prefectures score much higher; one cannot imagine that the psychological pressure on pupils could be any greater elsewhere in Japan.

Davis (1966) has described the "frog pond" process in high-quality American universities. Students with a particularly high disposition toward academic performance become concentrated in colleges with many similarly able and motivated fellows. Not being sufficiently appreciative of how able they are on the absolute scale, many of these brilliant students do poor work because they compare themselves mainly with the few talented around them. Severe competition seems to attenuate the aspiration for high-quality work. There were several contextual analyses of this sort in the IEA report. Seemingly, intense rivalry in examinations does not bring lowered aspirations in Japan. Since enrollment rates at the end of secondary school in Japan are not greatly below those in the US, one could say that the objective chances for a Japanese child to continue in school are high. On the other hand, there is an obsession with entering the few prestige universities, and, earlier, the secondary schools that feed them. In these terms, mobility opportunities are low.

Innumerable personality studies exist for other countries as for Japan. But on all of them, intra-nation dispersion is very large and inter-nation differences modest in most cases. It seems difficult to relate these findings to school performance. Recent data on trends in attitudes in Japan, while interesting, seem hardly to explain the persisting high level of Japanese achievement. Suzuki (1966) finds a growth of hedonism over the last decade, some decline in passive adaption to nature, less anxiety about carrying on the family line through adoption if necessary, more readiness to tell the child his teacher has misbehaved, more readiness to put individual happiness ahead of national welfare, and less feeling of inferiority toward Westerners. Shall we then expect a decline in school achievement in Japan?

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IV

POLITICAL SOCIALIZATION: ITS IMPLICATIONS FOR AN INTERNATIONAL STUDY OF MATHEMATICS ACHIEVEMENT[1]

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The child's acquisition of active adult membership in his society, through the process called socialization, has been studied in broader contexts during the past ten years. Earlier research had concentrated upon the socialization of impulses (e.g., orality and weaning), upon early childhood, and upon the family as the agent of socialization (Child, 1954). The widening of that conceptualization is clear from an examination of a few particularly important studies: Whiting and Child's cross-national study of the relation between child training and personality (1953); Brim and Wheeler's study of socialization in adulthood (1966); Kohlberg's consideration of the socialization of sex role and moral judgment (1963); Hess and Shipman's work on the socialization of cognitive modes (1965); DeFleur and DeFleur's investigation of children's socialization into the world of occupational roles (1967).

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[1] Much of the data referred to in this paper is presented in detail in a book by Robert Hess and Judity Torney entitled The Development of Political Attitudes in Children, Chicago, Ill., Aldine Publ. Co., 1967. The total research was supported by the Office of Education, Cooperative Research Project No. 1078 (Robert Hess and David Easton, Senior Co-directors), and was done while both authors were at the University of Chicago. Supplementary data analysis was supported by the Office of Education, Small Contract No. S-209, and is reported in "Structural Dimensions of Children's Political Attitude-Concept Systems: A Study of Developmental and Measurement Aspects", Judity Torney's Dissertation at the University of Chicago.

Four students at Illinois Institute of Technology contributed suggestions and interview excerpts, which are incorporated in the revised paper, as part of a class project in 1968. These students were Natalie Morgan, Evelyn Evans, Richard Cuttle, and John Briatico, Jr.

The concept political socialization had its first major usage in a review of literature by Hyman (1959). Subsequent published research has included the material gathered by Greenstein (1965), the work of the project discussed here as reported both by Hess and Torney (1967) and by Easton and Dennis (1965; 1967), Zeigler's study of the political attitudes and participation of teachers (1967), and Adelson and O'Neil's (1966) investigation by semi-projective techniques of the political ideology of adolescents. A recent survey (Dennis, unpublished) reveals an explosion of interest in empirical research in this field.

Why is this area so important for an understanding of the material which IEA has dealt with and will be dealing with in the future?

In order to understand we must consider the process by which children become socialized into social systems. Socializing agents perform two functions. First, they socialize the child to act within the particular sub-system in which socialization occurs. The school teaches the role of pupil within the school; the family initiates its offspring into the role of child and into sex role. Secondly, these institutions also socialize the child into roles in other systems. For example, the home may prepare the child for the role of pupil by encouraging attentiveness and compliance to authority in various situations.

When a system of roles is removed in time (as well as in directness of demands) from the socializing agent, we refer to anticipatory socialization. In these situations skills in role performance may be imitated in childhood but cannot be fully utilized until adulthood. Children's spontaneous and frequent imitation in play of parental roles, teacher roles, and sales clerk roles, for example, give one indication of the extent of anticipatory socialization to adult roles. The importance of this sort of role practice in the socialization process has been stressed by Kohlberg (1963) and Maccoby (1959; 1961) among others. This paper considers the school as a socializer of the child into other systems in the society, particularly the political system. The importance of the school as it integrates the child into its own system (into the role of pupil) will be more completely covered by Hess and Shipman in a forthcoming publication, and is dealt with in this series of papers by Sealy.

Models of Political Socialization

Rather than simply describing the content of the political attitudes acquired by children in the United States we have considered four models which may be used to explain the socialization process and which also may be applicable to the process of learning of mathematics, science, or a foreign language.

1. The Accumulation Model. This approach makes the assumption that skills, attitudes, and role expectations are simply accumulated in relatively unrelated units. Adults make frequent, direct and specific attempts to teach children those things which they believe that children should know. Because there need not be any logical consistency between the elements presented to the child, this might be called the confetti theory of storage and retrieval. It makes few assumptions about the child's abilities or needs as they may limit or facilitate the teaching process. Someone who implicitly follows the Accumulation Model is likely to expect that what is taught and what is learned will be identical. A curriculum which requires that the child memorize dates or facts by repetitive drill or that he learn to apply a single method of problem solving by plugging given numbers into formulas to produce solutions illustrates this model.

2. Role Transfer Model. This model (Hess & Torney, 1967) stresses the patterns of need fulfillment and motivations that the child possesses as a product of his experience in different roles, as a boy or girl child in his family and as a pupil in his school, for example. He brings these motivations and expectations to the current learning situation. There is considerable overlap between systems in the socialization process. Sex roles and roles adopted in

response to parental authority are probably adopted by the child in dealing with the political authority system as well. The assumption is that children modify, structure and may even distort information in accordance with the external structure of their roles and the internal structure of their needs.

There are many similarities between this approach and concerns of the educational researcher. Attempts to facilitate transfer of learning, learning sets, and curricula which include the application of past experience to the understanding of the motivation of characters in literature are examples.

The child's previous learning of certain roles and attitudes and his ability to transfer these to the school situation can be of crucial importance. For example, without the generalized performance of the compliant pupil role other school teaching and learning becomes very difficult.

3. Identification Model. This point of view (Kelman, 1958; Queener, 1949; Sears, Maccoby, & Levin, 1957) stresses the child's incorporation of modeling of the behavior or attitudes of some other person, usually a parent or teacher, even though the adult may never even have discussed the attitude with the child. The child may either model small units of behavior or he may take on general identifications, such as with a political party. In some cases the child may understand none of the ramifications of party identification, and the identification may therefore lack consistent relationship with attitudes toward partisan issues or candidates.

This model is adopted by schools when they bring scientists into the classroom with the hope that children will adopt elements of the scientific method. The use of the inquiry method in the laboratory and the simulation and role playing methods in social studies are other ways in which this model may be used (Shaftel & Shaftel, 1967). There may be large gaps in the child's background of information or attitudes when learning occurs in this way. For this reason this method is most useful in understanding the acquisition of motivation and value orientations (such as participant citizen action) and least useful in explaining the acquisition of cognitive elements.

4. Cognitive-Developmental Model. Here the emphasis is upon the existence within the child of tendencies to transform, stabilize and differentiate knowledge as well as to store it for retrieval. It serves to explain some of the slippage between learning and teaching, and is in some respects a reaction against the confetti theory assumed by the Accumulation Model. To quote Piaget: "the great mystery of development .... is irreducible to an accumulation of isolated learning acquisitions" (Piaget, 1967, p. 533). This model points out that the child's capacity to deal with certain concepts has an influence upon the learning he demonstrates. The distinction between concrete and abstract (Werner, 1948), the work of Piaget (reviewed by Flavell, 1963), and the application of Piaget's ideas to understanding the development of differentiated sex role (Kohlberg, 1966) are among the sources of this model. This model is peculiarly a developmental one, meeting the criteria described by Zigler (1963) for distinguishing developmental theories from other theories. Among authors interested in political attitudes, the major similarity is with the discussion by Adelson and O'Neil (1966).

Applied generally to the classroom, this model suggests limitations upon teaching materials and methods and gives clues to stumbling blocks children experience in the learning process. For example, it is difficult to teach children to think in an international framework before they are capable of conceptualizing units larger than the neighborhood, or to inculcate the value of internationalism without renouncing national identity when the child cannot think of himself as able to perform multiple roles. Likewise, the acceptance of the value of disagreement within the national government requires that children be able to perceive an ideal of government operation and contrast it with the realities of a given practical political situation.

Although it is not one of the models extensively used in discussing the political socialization material, it is interesting to speculate about the reduction-expansion model proposed originally by Roger Brown (1965) to account for language learning in toddlers. According to Brown, generalizing from intensive observation of language learning in a few children, the child expresses an idea in the following form - "truck". The mother expands the form - "That is a truck". The child reduces again - "Dat truck". Similarly in attitude development one may look at the child's attitude as he reacts to and retains one element of a situation, focusing upon and reducing the situation to terms he can cope with. In the case of language learning, the elements focused upon are usually the words with the greatest information content. In attitude development, on the other hand, it is often either a relatively unimportant or a distorted aspect of the situation upon which the child's attention remains, as this interview with a twelve-year-old boy suggests:

> I. What about groups of people who disagree with each other. Can you think of any groups like that who disagree?
>
> S. The Republican and Democrat Parties. They both think different ways.
>
> I. How do they think differently?
>
> S. The Republicans think you can't take people's land and possessions away from they if they buy them, and the Democrats think you can.

And another with an eight-year-old:

> I. Are there things the government does that the citizens shouldn't meddle with?
>
> S. Yes. (pause)
>
> I. Like what?
>
> S. (Long pause) Oh boy! Uh, like their marriages of their family, the President's family.

Much of the child's attitude development, particularly his understanding of the political influence process, may occur in line with the reduction-expansion model. The child may reduce the information he hears about the pressure groups, power, and dissent to simple terms - "You could write to the President". Subsequently this view may be expanded when the cognitive equipment becomes more mature and the child requires less reduction of complexity. A more complete analysis of this model (which draws particularly from the Cognitive-Developmental and Role Transfer point of view) would demand observation of the process of attitude development and modification as it goes on in situations like the classroom. The work of Mary Alice White (White & Boehm, 1968), who observes children when they are asked to teach each other, may be useful in understanding and under what conditions elements are reduced and under what conditions they are expanded.

It has been possible only to suggest the types of learning which are most clearly related to specific models. Progress in understanding the process by which attitudes are developed and changed demands that some conceptualization of models be set forth, matched with available evidence and tested whenever possible.

The models of the learning process which are stressed in mathematics training are the Accumulation and the Cognitive-Developmental models. However, apart from mathematics teaching and curriculum, it is also important to consider other aspects of the school's activity. What kind of role behavior within the school must be created for learning to occur at maximum efficiency? The school is often held responsible for socialization into roles: How much of this responsibility can be given to the school without causing more technical aspects of its educational functioning to suffer? How is this allocation of socialization responsibility made? For example, does the school assume functions when the family seems unwilling or unable to perform them?

A school which has historically evolved the responsibility for multi-system-socialization may have correspondingly fewer resources for the teaching of a specific academic subject, in this case mathematics. This possibility arises from the same line of reasoning as the specialization hypothesis in the IEA Mathematics Study (Husén, 1967). It was hypothesized that the level of mathematics achievement would be higher in schools where the number of subjects included in the curriculum was smaller. Because of difficulties in precisely determining the degree of specialization, this hypothesis was considered neither proven nor disproven by the data. The problem of determining with any exactness the effective teaching that goes on in the classroom is pointed up by the IEA findings. Ratings of the Opportunity for Learning, obtained by IEA from teachers, seemed more useful as measures of the amount of effective learning-time children had had than did number of subjects studied.

In the political socialization study teachers were asked to evaluate how much time they spent teaching each of several specific topics within the general area of political learning and how important they thought the topics. Since the children's political questions were attitudinal rather than the type which could be scored right or wrong, there was no opportunity to correlate curriculum with achievement. We also feel that much of the political socialization which is accomplished in the classroom is not necessarily part of planned curriculum but may occur through other models, at times other than that scheduled for social studies, and may not be recognized by the teacher. Children are learning role behavior throughout their waking hours. As an example of sex role learning in school which took place quite incidentally, my nine-year-old daughter came home with a dictionary assignment. After looking up the underlined word, she was to answer the following question: "Are boys more belligerent than girls?" Upon reading her affirmative answer, I questioned her. She answered, "Because it means warlike, and besides the teacher said that was the right answer."

The school also devotes considerable resources to political socialization including the development of compliant citizen-pupil role, teaching of facts about governmental structure, the development of national feeling and identification, and the adoption of participant group attitudes. And, even more than in mathematics, it may not always be possible to obtain accurate ratings of the child's opportunity to learn or to acquire an accurate understanding of the process of role transfer through which roles and attitudes toward authority learned in one context may be transferred to another. One must assess also inadequacies of role learning in the family which may force the school to devote extra resources to role teaching. A clear example of this is the inner-city classroom where the teacher must be so concerned with socializing the child to the compliant pupil role that she has limited time and energy remaining to teach academic subjects.

The Content of Political Socialization

Part of what is important to know about political socialization is descriptive. What attitudes about the political system does the student develop? How is a second grader different from an eighth grader in his attitudes? What conceptualization of the system does the child have and on what level of concreteness or abstraction? What characteristics of it are most relevant to him? What norms or ideals of action does the child hold for himself as an active participant? How does he believe he ought to act and how should the system act toward him? What role does the child actually take in his actions? The induction into such role relationship can occur in the absence of direct interaction between child and representatives of the political system; socialization into political roles is in large part anticipatory.

How broad is the content of political socialization? It was concentrated in studies of children's party preference and attitudes on dimensions such as liberal-conservative in early reviews such as that by Hyman (1959). More recently social scientists interested in cross-national comparisons have considered aspects of the political functioning which are taken for granted in the operation of our system (see Almond & Verba, 1963; Almond & Coleman, 1960; Levin, 1963). The questionnaire used in the study of children in the United States reported here has expanded this view still further. The subject matter considered may be divided into five parts. First, attitudes toward the country and patriotism or nationalism; second, attachment and positive feelings toward the governmental institutions responsible for administering the country and their personal representatives such as the President; third, response to the compliance system (the structure and persons concerned with rules and laws); fourth, the perception of the responsiveness of persons holding governmental authority to demands which the citizens may make; fifth, the mechanism of elections as a means of changing governmental incumbents and the political parties which mobilize and organize conflict.

Description of Research

The data we will present come from a study of approximately 12,000 children in the elementary school grades 2 through 8 (ages approximately 7 through 14) who lived in one large city and one small city of each major region of the United States. These children, approximately 1,500 from each city, answered an hour-long questionnaire sometime during the period from December, 1961 through May, 1962 (Hess & Torney, 1967). In addition to the questionnaire material, information about the children's IQ was collected from school records with different tests converted to a common scale. The children's teachers answered a questionnaire similar to that administered to the children and described their curriculum practices.

Family Influence

To summarize the role of the family in political socialization from an analysis of covariation in the attitudes of siblings (Hess & Torney, 1967), the family appears to support consensually held attitudes rather than to teach its children attitudes which contrast with those held by the majority of the community. However, the family does exert a major influence upon the open partisan feelings following an election. This effect, which fits the Identification Model, is further confirmation of data noted by many other investigators. One way in which this study has departed from others is in pointing out that there are many important aspects of political socialization other than political party affiliation and candidate preference. The family appears to play a limited role in inculcating attitudes which correspond to non-partisan cleavages within the community or in transmitting attitudes at variance with those in the community. In areas other than political party and candidate preference, the families' most effective position appears to be in support of other institutions which teach and transmit political orientations.

The Influence of the School

What do we know about the role the school plays in the political socialization of children in the United States? First, tremendous changes occur during the elementary school years in the child's conceptualization of an attitude toward many aspects of governmental function. In many areas, the mean attitude of eighth grade students is very similar to the mean attitude of teachers. It is probable that all institutions (certainly both the family and the school) contribute to the acquisition of attitudes which are held with great consensus. However, we can point to attitude areas where, over the course of the years from grades 2 through 8, children become very much like their teachers and contrast them with areas in which similarity is very high at the time of school entry, and also with areas where teachers and eighth graders are very different (suggesting that the socialization of these attitudes occurs in high school or beyond). We have used the attitudes of teachers as an estimate of adult attitudes against which to compare children.

We have supplemented teacher attitude information with teachers' ratings of the types of curriculum they consider important, how much time they spend on given topics and how they present the curriculum. In many cases the degree of teacher-student similarity is related to the focus of curriculum reported by the teacher. This is somewhat similar to the relationship between opportunity to learn and mathematic achievement on particular items in the IEA mathematics study.

The Development of National Feeling

When we asked children why they would rather be American than another nationality they gave replies like "I'd rather be an American because I like America better; because we have freedom and I know more people here". In the United States attachment to the nation appears to be fixed at an early age. Students at all grades tested have definite ideas that "America is the best country in the world". (That is to say there were fewer than 10% "don't know" responses at all grades tested in response to this question, contrasting with questions in other areas where "don't know" was a considerably more frequent response). Children also associated the word "democracy" with America; however, if they could give a definition of democracy it was often "what we have in America". When asked to react to specific definitions of "democracy" the percentage of "don't know" responses was greater than 35% at grade 4. Young children in the United States also express the opinion that Communism is a threat to our country, although they can provide little detail about its specific ideology or the nature of the difference between the countries or political systems.

By the time the child enters school or soon thereafter, a positive tie of affection to the country has been formed. It is possible that feelings about the country as a group to which he belongs may be generalized in part from the child's early membership in his family by means of the Role Transfer Model. The child feels very positively about his country although he may have no clear conceptualization of its boundaries or ideology.

Interview material gave evidence that the school provides symbols and cues which support the positive nationalistic attitudes which are highly valued by mearly all adults and by the mass media (even Batman fights an occasional spy). For the young child symbols of the nation such as the flag and Statue of Liberty seem important as objects for attachment and for conceptualization of our country's heritage.

A recent cartoon in the New Yorker portrayed a crew of Martians on a flying saucer circling the Statue of Liberty, one saying to the others "He's fallen in love with her!" When asked why this cartoon was funny, my nine-year-old daughter replied "Well, its's funny because they love her, and she's a statue; but I hope they won't take our freedom away."

To investigate the part played by national symbols in a supplementary study in 1964, we asked children to choose the best picture to show what America is; the flag and the Statue of Liberty received the largest number of choices at all grade levels (with the exception of grade 2 where George Washington received the largest number). We were also able to demonstrate that even young children make a differentiation between America (their country) and the government. The flag and the Statue of Liberty are frequently chosen as symbols of the government of America. In other words, the youngest children in our sample had been oriented toward the symbols of America, probably as a result of experiences with various agents of socialization. However, specific acts of patriotic ritual, like saying the pledge of allegiance and singing patriotic songs, are fairly well restricted to the classroom. It is a frequent occurrence in school - more than 99% of the classrooms surveyed displayed the American Flag; more than 90% of the teachers reported that the children said the pledge to the flag daily; 58% of the teachers of grade 2 reported that a patriotic song was sung daily. Although it is debateable whether the school is the sole agent socializing the child into nationalism, it does allocate time each day to foster a sense of awe and submission with regard to the symbols of government and to stress the group nature of national feeling.

The school almost certainly contributes to the child's cognitive elaboration of national feeling. Attachment to concrete objects and symbols are less important for older children. In response to the question,"What makes you most proud to be an American?", "freedom" and "right to vote" become increasingly popular with age, approximating the responses of teachers by grade 8. Only in the later grades of elementary school is the United States seen as part of an international system. This was most dramatically illustrated by changes in response to the question, "Who does most to keep peace in the world, the United States or the United Nations?" Fourteen percent of second graders chose the United Nations; 87% of the eighth graders and the same proportion of teachers made this choice.

The function of the school in developing the fund of attachment which helps to maintain the system may vary from one country to another. Frey (1966), in discussing the drastic differences in the process of creating and maintaining national attachment in the Turkish peasantry, points to the crucial role of literacy (and likewise of education) in strengthening nationalism.

> Those peasants with more cognitive flexibility, probably acquired through greater exposure to change via the mass media, becoming literate, attending school and traveling away from home, seem to make the transition to national identification more readily, over and above the trust provided by specific communications directed at them by these institutions (Frey, 1966, p. 20).

In other words, the school as a socialization agent for national identification in other nations may require even more educational resources than it does in this country. Because of this important use of resources, teachers may be less effective in their coverage of other subjects, or may place them in a slightly different perspective.

The Development of a Relationship to the Government

Young children structure their perceptions of the world in simple and concrete ways. In order to cope with the complexity of a political institution, for which clear and concrete symbols like the flag and Statue of Liberty are not provided, children initially conceptualize political systems as persons to whom they develop personalized relationships. As children become attached to these persons, they become related to the political system. To the child, the government is a man who lives in Washington while Congress is "a lot of men who help the President". There is a rapid change with age in conceptualization of the government, particularly a decline with age in choice of the President as the best picture of government and the choice instead of Congress or voting (the ballot box). Nearly 50% of eighth graders chose these impersonal or institutional aspects as closer to their own idea of the government; 72% of the teachers made these choices.

Children's ratings of qualities of the President and of governmental institutions also change over the elementary school period (Tables 1 and 2).

Table 1. Changes by Grade in Perception of Personal Responsiveness of President of Supreme Court
(Percentage choosing alternative -"Would always want to help me if I needed it.")

Grade	President %	Supreme Court %
4	45.6	23.6
5	39.5	21.8
6	34.1	23.7
7	32.6	18.1
8	27.2	24.1
Teachers	25.8	24.1

NOTE: N's for students range from 1,299 to 1,794; for teachers from 363 to 368.

Young children feel that they know the President personally. The average second grade child thought that the President would be nearly as helpful to him if he were in trouble as would the policeman or his own father. Younger children believe that the President is involved both in decisions about whether there should be war and with matters that affect only the city, such as where stop lights should be installed. In contrast, most students in grade 8 rate the President as much like impersonal and distant agencies such as the Supreme Court.

Older children can differentiate between the personal characteristics of the President and the types of competence he must have to perform his job. They like him less and expect less personal protection from him, but they have a continuing respect for his executive abilities (Table 2). Modal ratings of the President's role performance classified him as "knowing more" and "working harder" than most people, "always a leader", and "making important decisions all the time". The first three ratings had means which were quite constant from the fourth through the eighth grade; ratings of his decision-making were higher at the more advanced level. Teachers and eighth graders differed only slightly on these and on the majority of ratings of authority figures. The older child is more likely to view the President as someone whose abilities allow him to meet the demands of his office.

Table 2. Changes by Grade in Perception of Decision Making of President and Supreme Court
(Percentage choosing alternative - "Makes important decisions all the time.")

Grade	President %	Supreme Court %
4	50.6	29.6
5	51.7	36.0
6	52.8	44.2
7	56.0	47.2
8	58.5	52.2
Teachers	58.0	67.6

NOTE: N's for students range from 1,307 to 1,800; for teachers from 372 to 379.

The older child focuses on leadership and decision-making in perceiving institutions of government which do not have highly visible personal representatives. There is considerable increase with age in the mean ratings of the Supreme Court and the government on knowledge and decision-making (Table 2). Expectation of personal protection from the Supreme Court is much less widespread than is this expectation from the President (Table 1). The increase with age in regard for the office of the Presidency and for institutions whose offices are filled by unknown individuals is an example of the acquisition of relationships with roles rather than with persons and is important in maintaining support for the governmental structure when role occupants change.

The image of the President, though it becomes quite like that held by teachers, seems to develop in the absence of very much specific information. Personal authority figures have importance in the induction of the child into the political system to a much greater extent than teachers seem to realize. In teachers' reports of curriculum, there is only slightly more emphasis on the President than upon Congress. The importance that the President holds in the young child's conceptualization of government does not seem to be determined primarily by classroom learning. It may be influenced by the mass media, but it also reflects the child's tendency to focus upon a personal representative of the political system because he is not cognitively ready to comprehend the government as an abstract institutionalized entity. He reduces the information presented to him by the school or the mass media,focussing upon that portion of it which matches best his own needs or interests. He may also transfer to the President the approach to personalized authority which has been useful to him in dealing with other social systems like the school.

The child approaches the many other systems through personal authority. His image of the church is initially one of human and super-human figures; his understanding of the school is concerned with teacher and principal. The symbols and visible personal offices which are part of a particular government may allow children to focus on a specific person and may influence the opportunities for socialization open to a teacher. In one respect the existence of a particular government role structure and the set of role incumbents may help write the social studies curriculum.

The Development of the Role of Citizen

The third major area concerns the behavior of a citizen - both its expected ideal form and the way a child perceives citizens actually acting within the system. Various methods have been proposed for conceptualizing citizen behavior. In their study of five nations, Almond and Verba (1963) proposed a distinction between subject competence (feelings of competence in dealing with government bureaucracy) and citizen competence (feelings about one's ability to get a law changed). Young children in the Hess and Torney interviews emphasized personal goodness as the main job of the citizen - "A good citizen is a person whose house is clean and who is polite." The modal definitions of the good adult citizen by fourth graders was "someone who helps others" and "someone who always obeys laws"; the focus had changed by grade 8 to "votes and gets others to vote" and "is interested in the way the country is run". These response proportions were similar to those of teachers.

"Obeying laws" is seen as one of the citizen's important jobs by many children. Many social systems include a sub-system which serves to obtain compliance from its members, and it is particularly useful to discuss the compliance system as it is linked with the political system. Children's perceptions of laws and rules and of the individuals who enforce them (particularly policeman, parents, and teachers) were the most prominent aspects we studied. Like induction into the political system in general, induction into the compliance system occurs through visible authority figures - particularly the President (who is seen as making laws single-handed) and the policeman.

Two elements of the compliance system have particular importance for the socialization conducted by the school. First, compliant roles for children in response to authority are a basic characteristic of all systems except the peer group - that is, of the family, school, church, and polity. It is here that the Role Transfer Model is most relevant. It is also true that teachers place greatest stress on duties of the citizen - particularly elements which fall clearly within the compliance system (Table 3). In a separate analysis of the importance teachers attributed to these topics, the only three items rated by a majority of second grade teachers as more important than basic subjects (reading and arithmetic) were the law, the policeman, and the child's obligation to conform to school rules and laws of the community. In the United States teachers of children in the early grades believe that part of their task is to socialize children into

Table 3. Percentage of Teachers of Grades 2 through 6 Who Reported Spending More than Three Hours of Class Per Year on Each of the Following Topics

		Citizen Role			Branches of Government			International Organization	Controversial Issues	
Grade Taught	N	Duties of Citizen	Rights of Citizen	Citizen's Power to Influence	President	Congress	Supreme Court	United Nations	Political Parties	Politicians
2	24	45.8	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3-4	34	44.1	20.6	6.5	8.8	0.0	0.0	9.1	3.0	0.0
5-6	40	61.5	28.2	12.5	28.2	17.5	17.9	37.5	15.4	7.7
7-8	23	59.1	60.9	26.1	65.2	65.2	60.9	43.5	43.5	17.4

NOTE: Teachers could check as many topics as they wished.

compliance; this continues throughout the elementary school years.

Teachers seem to feel more competent to teach children about the ideal norms of democratic citizen behavior than about the actual operation of the political system and the ways in which a citizen can exert influence upon the system. The majority of traditional curricula in social studies are designed on the same general framework as mathematics curriculum with the Accumulation Model in mind. A major difference, if course, is that in mathematics one deals with abstract reasoning processes and learns how to apply ideal rules to concrete situations. The ideal norms which the child learns in social studies may be modified as he observes (both during the school years and in later life) the realities of social and political experience. The teacher is in a point of delicate balance, and we have some evidence that the degree to which she consciously attempts to inculcate ideal norms, as opposed to the realities of political life, depends in part upon her perception of the readiness of her students. For example, only 18% of second grade teachers reported in presenting material about the country that they pointed out both good and bad aspects; 68% of seventh and eighth grade teachers reported this more critical position. It is probably true that even at the later grades teachers do not express in class reservations they may have about the operation of the political system (Table 4). For example, there is a large difference between

Table 4. Changes by Grade in Agreement that "What goes on in the government is all for the best."

Grade	Total N	% Agreeing
3	1,368	90.7
4	1,511	92.8
5	1,619	89.7
6	1,575	86.0
7	1,506	81.4
8	1,503	76.0
Teachers	341	45.5

eighth graders and teachers in agreement with the item, "What goes on in the government is all for the best" (and also in another item not shown, "The President - or the government - never makes mistakes.").

Among the realities of political life that teachers appear to avoid teaching about are the influence of pressure groups (lobbies, and special interest groups) upon public policy. The teachers consistently attributed more power to unions, big business, and newspapers in their influence upon "laws made for our country" than did eighth graders (Table 5). In contrast, students attributed power to the average citizen which was equivalent or superior to the influence wielded by big companies, rich people, and newspapers. Level of response from the fourth to the eighth grade was similar; there was a striking difference between eighth graders and teachers. Either this facet of governmental process is not handled by the teacher in the classroom or children are not ready, in a cognitive-developmental

Table 5. Changes by Grade in Rating the Influence of Officials, Pressure Groups, and the Average Citizen (Mean Ratings)

Grade Level	Rich People	Unions	News-papers	Churches	Big Companies	Average Person
4	2.3	1.8	2.3	2.2	2.1	2.3
5	2.4	1.8	2.5	2.3	2.2	2.3
6	2.4	1.8	2.5	2.5	2.3	2.4
7	2.4	1.9	2.4	2.5	2.3	2.4
8	2.3	1.9	2.3	2.5	2.3	2.2
Teachers	1.9	1.7	1.7	2.4	1.7	2.1

NOTES: Items, "How much do these people help decide which laws are made for our country?" (1) Very much; (2) some; (3) very little; (4) not at all. Lower numbers correspond to greater rated influence.

N's range from 1,141 to 1,703 for students and from 368 to 376 for teachers.

sense, to absorb information which contrasts with the ideal norms of democracy that they have learned (e.g., that the average voter has a great deal of power).

Children become socialized to the democratic ideal of citizen power as evidenced in the Political Efficacy Scale (Table 6). The items concerned the influence which children perceive themselves, their families, and people like themselves to have upon the government and was derived from similar scales used with adults. There is very great difference between the responses of third graders and those of eighth graders.

Table 6. Changes by Grade in Political Efficacy
(Percentage of Respondents Whose Mean
Efficacy Score was Greater than 2)

Grade	N	%
3	1,245	25.4
4	1,427	27.9
5	1,623	46.9
6	1,603	55.5
7	1,625	60.3
8	1,116	67.7
Teachers	339	81.4

NOTE: Five items dealing with government responsiveness to citizen action. In each item, 1 was the equivalent of the least efficacious response and 4 of the most efficacious response.

There is about as much difference between eighth graders and teachers as between eighth graders and fifth graders. Certainly eighth graders do not in actuality have the political power potential of adults - but a majority of them believe that they will have this power when they reach adulthood.

In summary, eighth graders and teachers were much alike on the ideal statement of the power an individual has in a democracy, in the ratings of authority figures and on attitude statements which made up the bulk of the questionnaire. They differed in their view of the realities of political life, the teachers being more willing to admit that what goes on in the government may not be all for the best and more ready to recognize the role of pressure groups and special interests in the formation of legislation. There is also a tremendous difference between teachers and eighth graders in the amount of reported interest in government and in the concern expressed with political issues (see Hess & Torney, 1967). This suggests that the anticipatory political socialization which occurs in elementary school is primarily toward the acceptance of ideals about the role of the citizen; facts about the realities of political life and the skills and resources necessary to exert political influence are considered only in a rudimentary way. Or if they are presented, the reduction process appears to cause the loss of much detail in the child's representation.

The Development of Attitudes Toward Political Parties

Patterns of teacher-eighth grade similarity in political party attitudes present more evidence about the focus of classroom political socialization. It was noted earlier that the family's influence is important primarily in partisan side-taking behavior. However, norms about the operation of political parties and about the proper form and amount of individual participation do not covary to a high degree within families. Judgments of whether and how a citizen should support a political party change over the elementary grades and become fairly close to the norms reported by teachers. Mention of political parties and pressure groups in the school curriculum begins particularly late in elementary school (Table 3).

Children appear to have strong motivation to minimize conflict when they view the political world. With the exception of elections, which are seen as legal and well regulated conflict, children have difficulty separating ideological conflict from the possibility of violent action.

I. "What about elections? Do people sometimes disagree then?"

S. "Not really. If they vote for someone else, they still don't hate the other guy."

I. "If there is a disagreement, what is it likely to be?"

S. "I don't know."

I. "Are these disagreements a good thing?"

S. "No, they may start a fight or riot or something like that."

This lack of differentiation between conflict and overwhelming aggressive action is one of the more crucial areas for the further study of political socialization.

Children were given a list of issues such as "helping the unemployed" and "helping rich people", along with less partisan issues like "keeping us out of war". When asked whether the Democrats or the Republicans did more to resolve the issue, the overwhelming response was that both parties did the same. As a matter of fact, there was a significant increase with age in the response that both parties make equal contributions to solving these issues. It was not until grade 8 that any sizeable proportion of children saw the Democrats as more concerned with the problems of unemployment and the Republicans with the problems of the more fortunate (Table 7).

Table 7. Changes by Grade in Perceiving Political Party Differences
(Percentages)

	Who does most to help "Rich people"					Who does most to help "People out of work"				
Grade Level	N	Rep.	Dem.	Both Equal	Don't Know	N	Rep.	Dem.	Both Equal	Don't Know
4	1,449	10.4	7.9	41.1	40.6	1,448	14.8	12.3	40.6	32.3
5	1,785	10.1	8.7	51.7	29.5	1,787	12.4	13.9	50.8	22.9
6	1,739	12.8	9.9	48.6	28.7	1,736	11.6	16.7	52.9	19.1
7	1,712	13.7	11.1	49.6	25.6	1,714	10.0	17.7	56.3	16.0
8	1,675	21.3	10.1	45.0	23.6	1,675	9.3	24.2	50.9	15.6
Teachers	375	40.8	4.3	44.3	10.6	375	1.9	47.7	44.3	6.1

There was no increase with grade in the consistency between the child's own preferred partisan commitment and his choice of the party which does most to solve such issues (see Torney, 1965). Partisan issues are not frequently discussed in the elementary school classroom. Children have a quite negative view of expressions of disagreement between the political parties. Less than 10% of the children agreed that it would be good or very good for the country if the political parties were to disagree more on their policies.

In charting the development of political partisanship in elementary school (Torney, 1965), the first stage is the lack of extensive attitudes or beliefs about parties. In the second phase, the child's own partisan identification is acquired, along with some partisan reactions to election outcomes which favor the candidate of his own party. There is some structural development in these attitudes as these affiliations and reactions become both more stable and more consistent with each other. There is no concurrent increase in the recognition of issue conflict between parties or in the belief that one's own party proposes better solutions for national problems. At least in the sample tested, at this stage there is a gradual increase in the belief that adults should operate independently of partisan commitment when making voting choices (see Torney, 1965; Hess & Torney, 1967).

Differences of opinion concerning the value of belonging to a party and variability in elements of partisan behavior are important on a national basis but may be difficult to study cross-nationally. Teachers probably have three options: to avoid the discussion of partisanship and partisan issues altogether; to present their own partisan position; or to socialize the child toward the belief that parties should demand only token allegiance. Zeigler (1967) reports that only 27% of his sample of high school teachers thought it proper during a Presidential election to explain to the class the reasons for their candidate preference. This suggests that in the United States teachers tend to avoid the classroom discussion of partisan issues. The realistic acceptance of conflict and the consistency between different aspects of partisanship are fascinating possibilities for a cross-national study of political socialization. This is an area where it is crucial to consider the inter-play of home and school. It appears in the United States that norms of appropriate political party support may be influenced primarily by the school, while the particular direction of commitment is more influenced by the family.

Intelligence, Social Class, Sex, and Religion as Influences

Most of the IQ differences were considerable, even when social class was held constant, and there was a greater difference between IQ groups at grades 7 through 8 than at the earlier grade levels (Hess & Torney, 1967). In almost all cases the children of high intelligence more closely approximated the attitudes of teachers than did those children of lower intelligence. Children of high intelligence learned at an earlier age norms for the operation of the political system and seemed more capable of adapting to events which indicated the government's fallibility. In most cases social class differences were considerably less pronounced, at least when IQ was held constant. One major exception to this was the sense of political efficacy, which showed very promounced differences by both IQ and social status. Some of the differences which have been attributed to social class by some investigators may in fact be a matter of intelligence, the ability to learn.

With our focus upon the socializing effects of the school, it is important to note that in the United States the child from the working class, when asked "Who teaches you most about being a good citizen?", is more likely to rate his teacher as high or higher than his father or mother; the opposite is true for children from higher status groups (Table 8). These sets of differences point to the importance of developing curricula within the school for dealing with children of lower ability levels.

Table 8. Relative Importance of Father and Teacher in Citizenship Training by Social Status

	N	Father More than Teacher	Both the Same	Teacher More than Father
Lower Status	2,386	17.3%	39.0%	43.8%
Middle Status	4,853	21.8%	40.3%	37.9%
Upper Status	2,962	27.3%	44.7%	28.0%

In any country where compulsory schooling ceases at an early age, differences in level of political socialization achieved by the final grade take on added importance. The child who is of limited ability and from the lower social statuses will be less likely to make up these deficiencies with adult socialization. Rather he is likely to associate with others who have little political interest and to be exposed to social contexts where political involvement is not highly valued. There will be little support either from family or peers for political interest. It is crucial for a system to socialize its members effectively in the first years of elementary school; those systems which are functioning effectively probably devote more of their elementary school resources to this end.

Democratic systems, if they are fulfilling their goals, must stress the equal socialization of all citizens into participant political roles. The IEA Mathematics Study, in contrast, found that one of the most important differences between countries was whether the emphasis was upon bringing as many students as far as possible or upon training an elite group to a high level of proficiency. In a developed system political socialization must bring as many as possible as far as possible. In developing nations, where the total population of adults as well as children must often be socialized, the stress may be upon elitization once one passes the minimum level of popular nationalism (see Frey, 1966, for a discussion of this problem in Turkey). An analysis by Torney (1965) was made of the small group of children, in the larger research group, who showed extraordinarily great involvement in political activities - perhaps the basis of future elites. These students tended to be of high intelligence, to make particularly clear differentiations between the political parties, and to hold unusually consistent political party attitudes.

Democratic systems also demand that boys and girls, men and women, be equally socialized into democratic citizen roles. In the data we have been reporting, girls express fewer political attitudes than boys, personalize the system more, and perceive non-personal institutions as less important. There are few sex differences in acceptance of norms and values about the system where the school appears to play a prominent role, and where attitudes are equally valued for both sexes. This is analagous to the IEA Mathematics Study finding that in societies where the mathematics professions do not discriminate on the basis of sex, sex differences in achievement were limited. Boys in our group did display more active and politicized concern than did girls, especially in partisanship and the taking of sides on political issues. This may be because the male and female adult political roles in this country place less stress on active involvement for women. It is our feeling that sex role is a crucial variable in all cross-national studies.

Analysis of the relation of Democratic-Republican party allegiance, peer group participation, and religious affiliation suggests that these variables have influence on only a limited number of items, particularly when social class or IQ is controlled.

As far as the agents of socialization are concerned, it seems that the school (acting both through the Accumulation Model and through the Role Transfer Model) and the family (acting primarily through the Identification Model and the

Role Transfer Models), exert together the most important influence upon the child's political socialization. It may be that the level of responsibility assumed by the school is related to the amount of time remaining for mathematics instruction. A second possibility is that in some countries pursuit of excellence in academic goals may be tied to achievement for the glory of one's country or for its industrial expansion. The child may be motivated to achieve in mathematics in order to make a greater contribution to his country. The IEA study reports a positive correlation between a country's achievement in mathematics and the attitude among students that mathematics is important for the society. This is consistent with the motivation-for-one's country argument. This two-fold possibility of the relationship of political socialization to mathematics achievement may make the discovery of linear relationships a difficult one; it may be necessary to assess the function of political attitudes within the nation and the socialization into the occupational system within a particular national culture. Likewise, the interplay between home, school, and mass media as it differs for different subject areas and in different countries must be considered.

The cognitive-developmental process operates somewhat independently of both home and school, phasing the child's readiness for certain types of school learning, structuring his reactions to family events, influencing his ability to transfer roles from the family setting to the larger systems of the society, and determining his tendency to reduce to manageable proportions the material which is provided him.

Cognitive flexibility acquired through general education may influence the development and differentiation of political feelings. Most discussions of the consequences of education for adult political attitudes stress that the sources of much of the influence cannot be specified except in terms such as the ability to view all sides of a question (Key, 1961). We have supplementary evidence

(Torney, 1965) that in addition to the information learned in school (Accumulation Model), the teacher as a model of behavior to be emulated (Identification Model) and the influence of experience in the role of pupil upon approach to the role of citizen (Role Transfer Models), the child also transforms the input materials and attitudes in accordance with the Cognitive-Developmental Model. It may be that in focusing only on specific aspects of the curriculum (e.g., how the structure of government is taught) we are overemphasizing the Accumulation Model to the neglect of the Cognitive-Developmental Model.

Political Socialization in Other Nations

Information about political socialization in other nations and cultures is considerably more limited than that reported here for the United States. Data from one study in this project suggest that Japanese boys, when compared with boys from four other countries (Puerto Rico, Chile, Australia, and the United States), showed low opinions of the honesty and benevolence of the Premier (Hess, 1963). In all other countries, all judgments at all ages for both qualities were higher than they were in Japan. It is interesting to note that Japanese boys' judgments of their leader's competence in the duties of his office was very similar to those in other countries. The findings for Japan suggest that the amount of time and resources allocated to political socialization (particularly the attachment of the child to the government through affection for a major government figure) may in fact be negatively related to mathematics achievement.

Some other interesting suggestions come from a re-analysis of data presented in a recent volume by Lambert and Klineberg (1967). Although they conceptualize their study as relevant to children's views of foreign people, it is possible to re-analyze some of their material to compare nationalism cross-nationally. Table 9 takes the countries which were represented in both the IEA

Mathematics Study and in the Lambert and Klineberg study and compares their standing on two variables. When Japanese children were asked to describe themselves, the three most popular adjectives were "poor", "intelligent", and "bad". This supports the previous contention that Japanese children may have a limited emphasis upon nationalism and personal attachment to government figures. This is an especially strong contrast to the United States, where the adjectives children used most frequently to describe their country's people were "good", "wealthy", and "free". Japanese children also expressed less positive affection for other nations and were more restricted in the content of their descriptions of other countries. Not only did Japanese children appear different from the five countries shown in this table, but they were also different from all of the countries tested by Lambert and Klineberg. This suggests that little is done within the Japanese schools to orient the child to positive national feeling or to an international framework; Israeli children seem positively oriented toward their own national system but have less positive feeling for other nations.

Table 9. National and International Attitudes of Countries Included in Mathematics Achievement Study[a]

Countries Ranked by Achievement in Mathematics[b]	Self Description[c]	Affection for Other Countries[d]
Above Grand Mean		
Japan	poor, intelligent, and bad	.30
Israel	good, religious, peaceful, and intelligent	.53
Germany	good, ambitious, wealthy, and intelligent	.67
Below Grand Mean		
France	good, intelligent, cultured, happy, and bad	.72
United States	good, wealthy, and free	.84

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[a] Based on data in Lambert, W.E., & Klineberg, O. Children's views of foreign people. N.Y.: Appleton-Century-Crofts, 1967.

[b] See Husén, Figure 1.1, Population 1a (13-year-olds).

[c] See Lambert & Klineberg, p. 102: 6,10, and 14-year-olds listed in order of frequency of mention.

[d] Affection Index - average of 10 and 14-year-olds from Lambert & Klineberg, Table 10.1.

Israel may represent a country where there is a stress upon academic achievement for the sake of national advancement. In addition to assessing the focus and impact of training for nationalism it would be useful in further studies to consider the sources of international good feeling within the school.

Summary

This paper has suggested a number of dimensions of growth in political attitudes. The home and school in the United States both seem to bear responsibility for this socialization into a system of the society. However, there seems to be no simple relationship between what is taught and what is learned in either situation.

It has been suggested that the number of areas of political socialization for which the school is responsible (nationalism, attachment to government figures, compliance, the transmission of ideals of citizen participation in a democracy) may bear a relationship to the amount of time available for other academic subjects. It has also been suggested that linear relationships may be obscured because in some countries the specialization model is appropriate, while in other countries academic goals may be endowed with patriotic meaning. Achievement may be encouraged for the glory of the country. This paper has also attempted to point out the role of different learning processes - the Accumulation Model, Identification Model, Role Transfer Model, and the Cognitive-Developmental Model - in accounting for different parts of the political socialization process. These models may be useful for understanding general system socialization and school learning as well. More generally, we conclude that a study of the socialization of children into the political ideals of nationalistic democracy, and internationalism, may be relevant for understanding a country's level of achievement in other academic fields.

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V

RELEVANCE AND FITNESS ANALYSIS IN COMPARATIVE EDUCATION

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Introduction

Cross-national comparisons in education are regarded as a special case of educational comparisons in general. It makes no profound difference whether we consider the educational systems of different countries at a given time, or parallel systems within a single country as in field experiments within new curricula. Nor does it make any difference in principle, if not in practice, if the symbol SA (or SA_1) in Figure 1 stands for the old system within a country and SB (or SA_2) for the new system in a cycle of reform. (A and B are symbols for different schools or curricula, and S stands for system.) With this in mind we shall focus our discussion on comparisons between SA and SB as school systems, comparable with regard to general objectives, age level of the pupils, etc., in two different countries at a given time.

Descriptive Comparisons

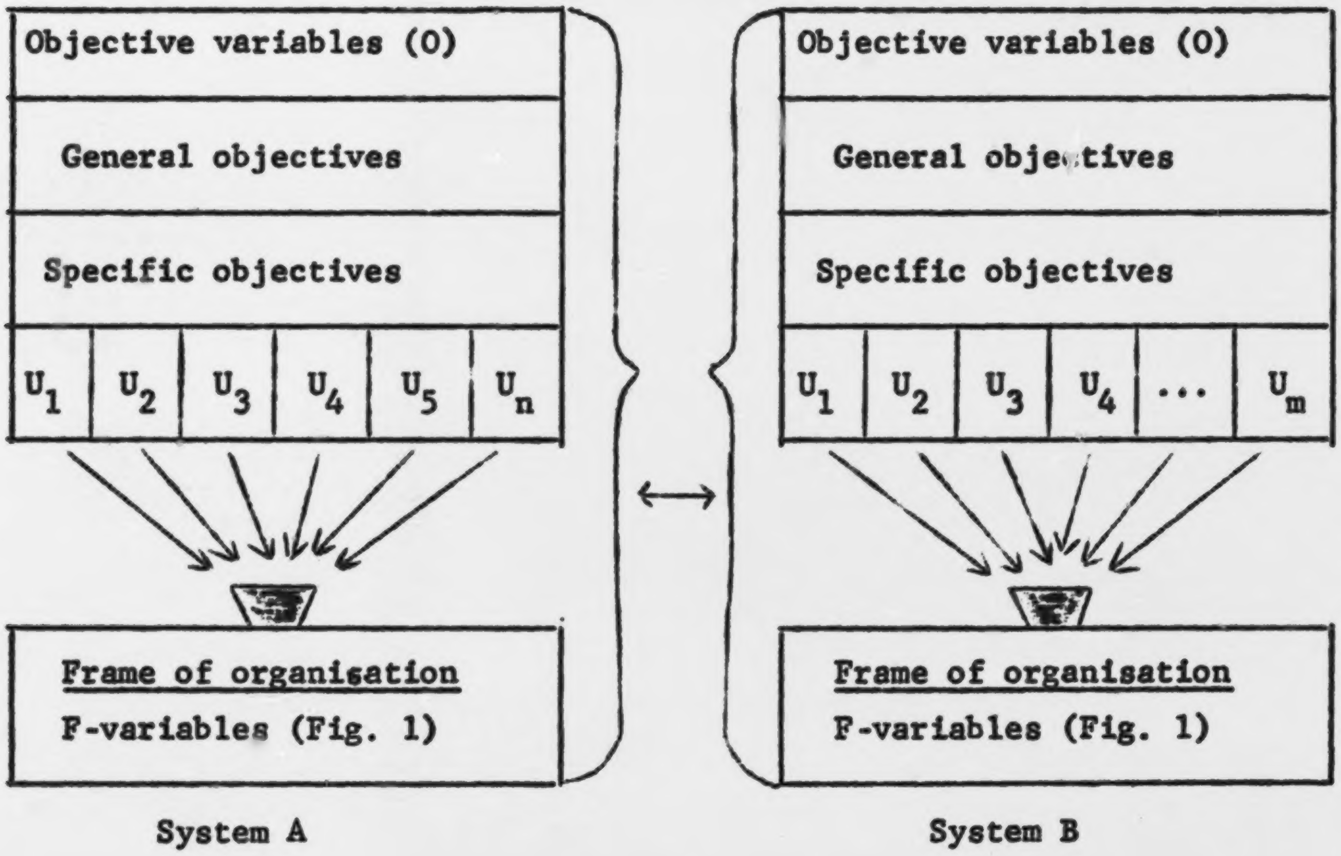
The most common way in making cross-national comparisons in education is to relate SA and SB to each other with respect to the school organisation. Most textbooks in the field contain descriptive charts of the organisational structure with regard to length of schooling, school forms and their connections with each other, lines and streams and so on and perhaps also including the proportion of pupils in an age group that are attending the different kinds of schools and lines. All these factors constitute the organisational _frame_ for the instruction given to the pupils. Since school forms and lines within a country often are closely connected with problems of supply and training of teachers, selection and grouping of pupils (as well as class size), it seems useful to summarize all these variables that constitute the outer and organisational premises for the teaching during the school year as _frame or F-variables_. The comparisons between the school systems then generally are made in terms of rather simple descriptions of the F-variables in the different countries (Fig. 1):

Fig. 1. Descriptive Comparisons of Frame Factors

Frame of organisation (F)		Frame of organisation (F)
Schools, lines, streams, Pupil selection, grouping, class-size Teacher supply.........etc.	⟷	Schools, lines, streams, Pupil selection, grouping, class-size Teacher supply.........etc.
System A		System B

A more complex version is demonstrated in Figure 2. In this case the more subtle problems of educational objectives and intended teaching contents is added to the picture in a more systematic way through more or less formal comparisons between official documents, guides for teachers, time-tables, etc. This study may deal with the objectives in general for the total school form or for a certain line of study, but it may also handle about the different subjects that are studied and the proportion between them in terms of the number of hours a week, etc. However, the study can also be limited to a certain school subject that may be divided into its different units (main elements and elements) and comparisons are then made between SA and SB with regard to the presence and non-presence of different elements and their expected proportions as far as these can be inferred from the basic documents regulating the teaching in the school system under study. This seems to happen very seldom, and the main reason probably is to be found in the freedom of decision for the local school authorities and for the individual teachers. In Figure 2, however, we use the symbol U_1, U_2, etc. for the different units into which any syllabus may be broken when studying it systematically. When analysing a school system, U may be read as school-subjects or general study habits, when studying a specific subject, U may be main elements and/or elements, e.g., algebra and functions in mathematics.

Fig. 2. Descriptive Comparisons of Frame and Objective Factors

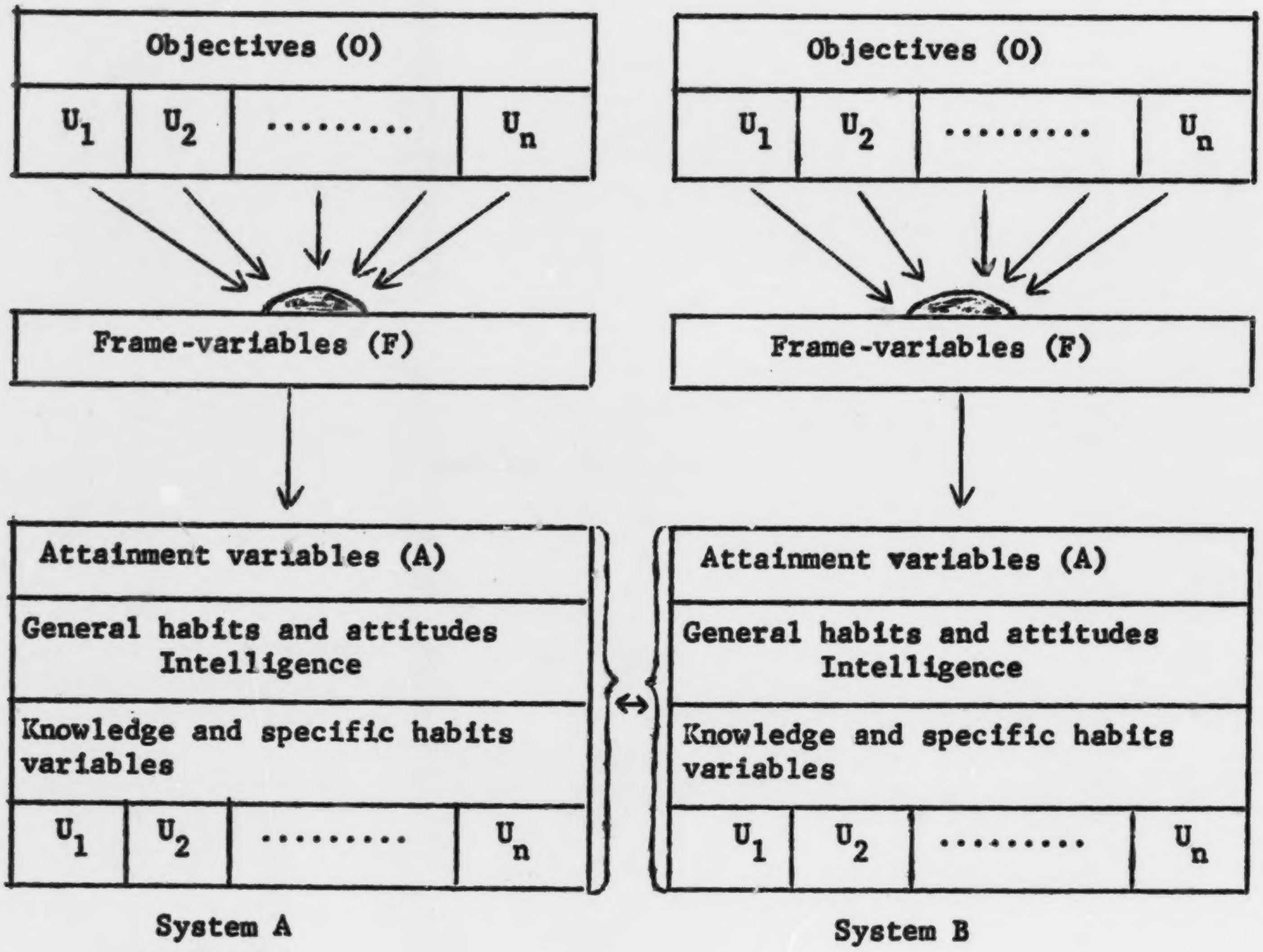

Objective variables (O)
General objectives
Specific objectives
U_1 U_2 U_3 U_4 U_5 U_n
Frame of organisation
F-variables (Fig. 1)
System A
Objective variables (O)
General objectives
Specific objectives
U_1 U_2 U_3 U_4 ... U_m
Frame of organisation
F-variables (Fig. 1)
System B

So far we have outlined the general characteristics of cross-national comparisons in textbooks and descriptive research. It has to be added that comparisons between systems in O- and F-variables need not be entirely descriptive. Given a sufficient number of systems it ought to be possible to study more general connections between O and F and also between different sub-variables within O and F. Such correlational studies seem, however, to be more useful if they have a theoretical foundation and/or are combined with either the conditions within the different societies or with the outcomes of education or with both. Since evaluation studies in terms of test performances are so common in educational psychology in general, we will start with them.

Evaluation Studies of Educational Outcomes

General Characteristics. Evaluation studies of educational outcomes imply the inclusion of a new set of factors which are used as dependent variables in an experimental or at least a quasi-experimental design. Since the outcomes are studied as a function of the school system in total or as a function of O- or F-variables within the systems - other O- and F-variables being kept constant - we may use the term attainments (A) in a wide sense, including different kinds of achievement (cf Bloom, 1956) as well as different attitude dimensions. In a general form the design may be written as in Figure 3.

Fig. 3. Design for Comparative Studies Including Attainment Variables


Objectives (O)
U1
U2
....
Un
Frame-variables (F)
Attainment variables (A)
General habits and attitudes Intelligence
Knowledge and specific habits variables
U1
U2
....
Un
↔
Objectives (O)
U1
U2
....
Un
Frame-variables (F)
Attainment variables (A)
General habits and attitudes Intelligence
Knowledge and specific habits variables
U1
U2
....
Un
System A
System B

Studies of this kind have hitherto generally been conducted as comparisons between different school-forms within a country. As regards cross-national research the IEA study in mathematics (Husén, et al., 1967) may be regarded not only as the first large scale study in the field but also as a very ambitious endeavor to cover complex relationships between different achievement variables and a lot of frame variables. From a methodological point of view this study may be regarded as an extension of comparative studies between school forms or other frame variables, e.g., grouping and class-size, conducted within a single country.

The Need of a Theory

The IEA study has demonstrated the existence or non-existence of many relationships in a setting in which it has been possible to get great variation within each of a number of independent frame-variables. The conclusions about the relationships are, however, in most cases descriptive and no attempts have been made to explain the results in a more systematic way. This is, however, to be expected neither with regard to the purposes of the project not with respect to design of national studies of minor complexity, e.g.,research on the grouping problem (Svensson, 1962; Borg, 1965; Goldberg, Passow, and Justman, 1966) and class-size factor (Marklund, 1962). Thus we believe we know that grouping and class-size as isolated factors are of practically no importance for pupil attainment, but we still do not know why, nor do we have any systematic theory of the mechanisms behind the results. At the same time, however, these results have attracted strong interest from the administrators and politicians with regard to national educational planning policies. Since national school reforms are large as well as long lasting enterprises it is, indeed, risky to base them on research findings that may be correct on a descriptive level but for which there is no obvious explanation, no systematic theory. Thus, there is a need for a more thorough understanding of the mechanisms behind the reported results also from the administrators' and politicians' point of view. With regard to the researcher, this ought to be expected by definition.

Facing the future research program of the IEA these considerations lead to the conclusion that priority ought to be given to studies aiming at explaining the results already reported. From this point of view there is no need to study other school subjects. On the contrary, intensive studies in mathematics should be recommended, with more detailed control of several factors at a time.

The Relevance Problem

Defining the Problem. The term *relevance* here applies to the relation between the attainment measures and the objectives of the systems under comparison. It goes without saying that a study aiming at evaluating the outcomes of school instruction in mathematics in different systems should use achievement tests that are relevant with regard to the objectives of the subject. If all the compared systems have the same objectives, then there is no serious problem as to what criteria should be used. The difficulties are then limited to the concretisation of the criterion in suitable test items. Nor is it any serious problem if the study aims at comparisons with regard to a single *norm* upon which competent researchers will agree as the best objectives of the study of the subject, irrespective of what is actually the case in the different systems under study. Then, of course, the actual differences in objectives between the systems have to be taken into account in the interpretation of the results, but there are still reasons for conclusions of the type that - for pupils of the same ability - the standard of instruction in system A is higher or lower than in system B.

In most studies, including the IEA, the relevance problem, however, is more complex. No single-norm criterion is at hand and the systems differ to a certain degree in their objectives even though the overlap is considerable. Table 1 shows a hypothetical case.

Table 1. Hypothetical Relations of Objectives in a Subject Consisting of 9 Elements

System	Units									Σ	^{N}U Total
A	U_1	U_2	U_3	U_4	U_5				U_9	6	9
B	U_1	U_2	U_3			U_6	U_7	U_8	U_9	7	
A + B	U_1	U_2	U_3						U_9	4	

In such a case evaluation may be limited only to the common elements with the corresponding limitations of the aim and results of the study. This will be a serious drawback if the common core is small. However, every element may be represented if the analysis is differentiated. In addition to the common elements (in this case $U_1 + U_2 + U_3 + U_9$) the elements differentiating between the systems may be investigated separately. Taking system B the problem then is: Will the probable loss in $(U_4 + U_5)$ be compensated by a corresponding gain in $(U_6 + U_7 + U_8)$? While Svensson (1962) primarily is limiting his study of grouping to common, basic elements, the IEA study is at least aiming at a multidimensional evaluation (Husén, et al., 1967).

So far we have been discussing the main variables (O, F and A). It seems quite reasonable to consider at least these three according to the principle that there are educational objectives to be attained under differing frame conditions such as recruitment and grouping of pupils, class-size, recruitment and training of teachers and so on. The fact that the general model

$$O \longrightarrow F \longrightarrow A$$

so far seems reasonable does, however, not imply that it is sufficient for research purposes.

Limitations of the Model. There are two limitations in the model, presented above, that seem to be of special interest. The first one applies to the difficulties of interpreting O. The text in a syllabus is often written in very general terms and it is very difficult to translate it into quantative measures. Of course, experts may rate and weigh the curriculum units with regard to their importance for the over-all objective, but this still does not tell us the whole truth about what importance they have in the actual instruction by the different teachers. Thus, the objectives need to be defined operationally according to the frame of reference of the teachers who are responsible for the instruction.

The second limitation concerns the relation between the F- and A-variables.

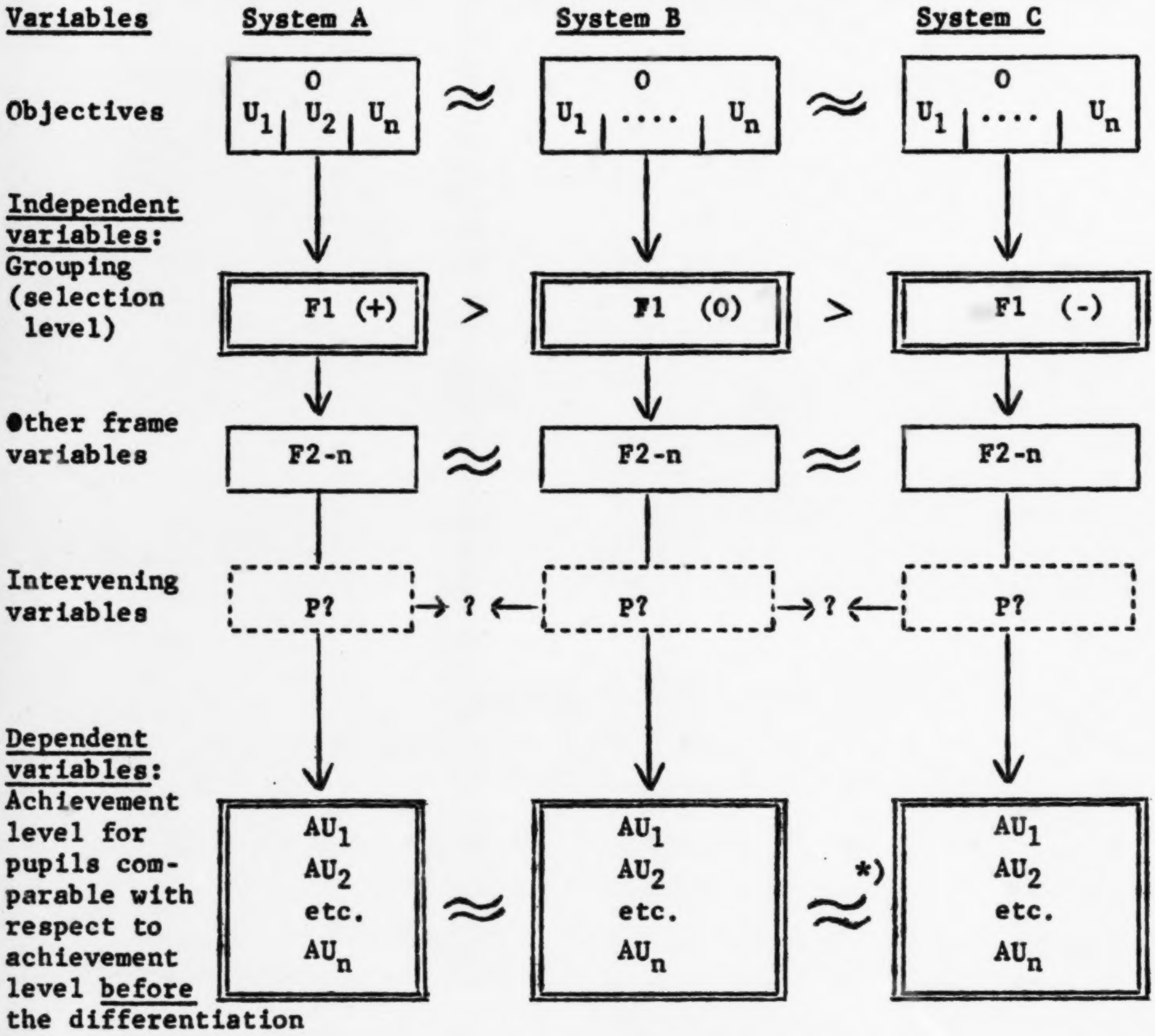
The attainments are generally tested at the end of the school year, but the evaluation is made against factors assessed at the beginning of the instruction period, e.g.,the structure of the class, the number of pupils, the competence of the teachers. As said before, these factors are acting as frames for the behavior in the classroom during the whole period. If significant differences between the compared groups are found, it means that the frame factors have been steering the behavior during the period in a characteristic way. From a psychological point of view, it is self-evident that the attainments do never emerge as a direct consequence of the frame conditions. Instead, they are the result of as many individual learning processes as there are pupils in the class and these processes are in their turn influenced by the existant frame conditions. The model, presented above, may thus be regarded as including a couple of hidden, intervening variables covering the educational process at school (and also outside the classroom) according to the following scheme:

Objectives (O) → Frames (F) → Process (P) → Attainments (A)

The Role of Process-Variables. The role of process-variables in comparative education can best be illustrated through reference to some recent investigations concerning the problem of grouping. One of the most detailed studies has been reported by Svensson (1962) (cf also Husén & Svensson, 1960). The main design and outcomes may be summarized as in Figure 4.

Although the interpretations differ to some extent- so the 1957 Governmental committee draws the conclusion that the negatively differentiated pupils suffer a loss in comparison with the undifferentiated ones- the main result is that grouping does not cause any significant differences in achievement level in basic respects, common to the objectives of the systems.

Fig. 4. Main Design and Reported Results of a Typical Report on Grouping: Svensson (1962)


Variables
System A
System B
System C
Objectives
O
U1
U2
Un
≈
U1 .... Un
Independent variables: Grouping (selection level)
F1 (+)
>
F1 (0)
F1 (-)
Other frame variables
F2-n
Intervening variables
P?
→ ? ←
Dependent variables: Achievement level for pupils comparable with respect to achievement level before the differentiation
AU1
AU2
etc.
AUn
*)

---

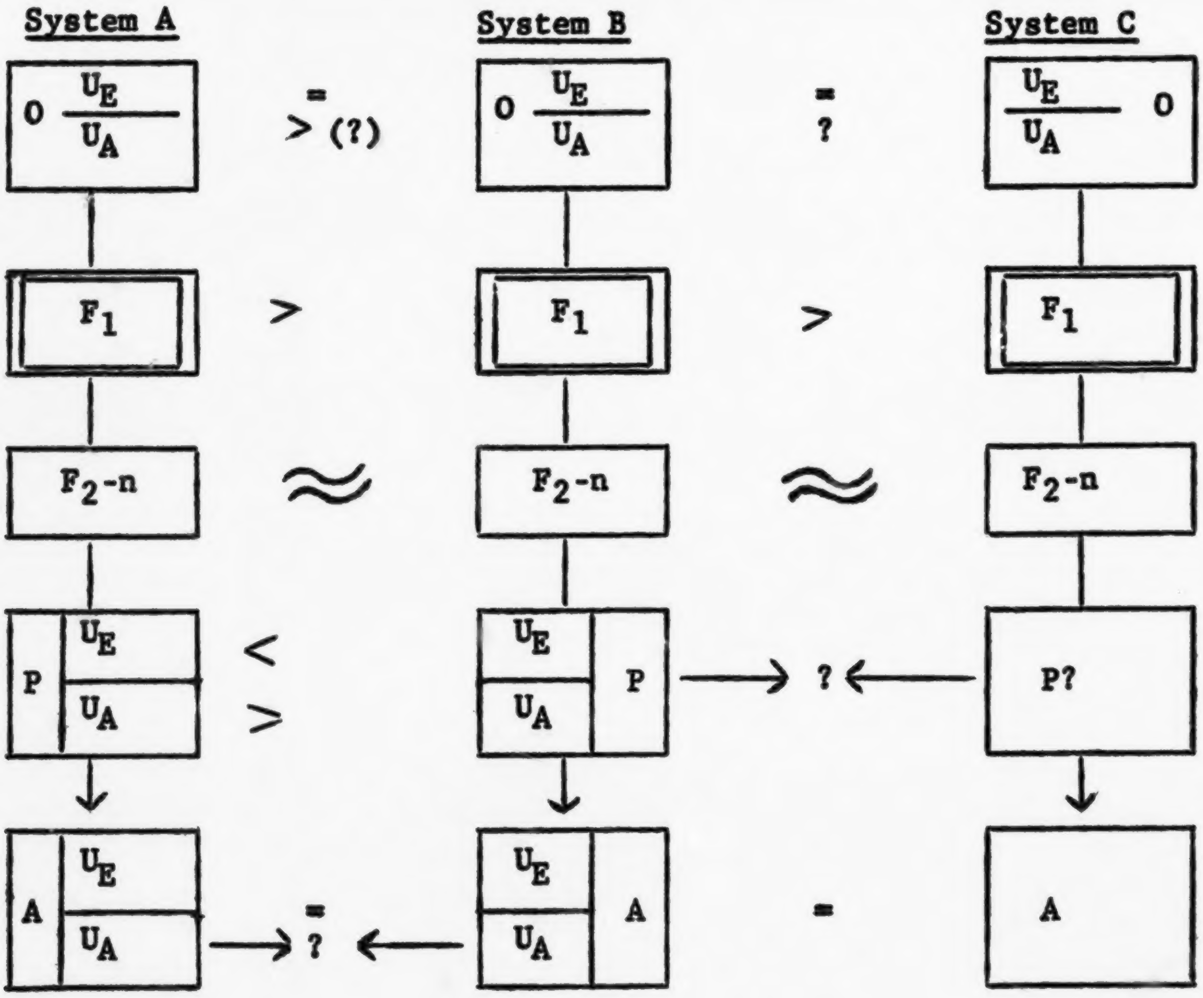
*) or ⪈ according to 1957 School Committee (SOU 1961:30 ch. 17)

In a recent study by the author (Dahllöf, 1967) it has, however, been possible to add data in the educational process into the comparisons between the same school forms that were investigated by Svensson. The process-data also refer to the same period, although they then were collected for quite different purposes (Dahllöf, 1960, cf also Husén & Dahllöf, 1960). The main results of the new study are the following:

1) A more detailed and systematic trent analysis of the reported findings - a technique first proposed by Ahlström (1963) - reveals that the relation between the groups as regards achievement is somewhat different than reported: There is a systematic gain for pupils of comparable ability in the positive selected group compared with the unselected but no difference at all between the unselected and negative selected ones. The same technique of analysis applied to another Swedish report of an experimental design (Carlsson, 1963) and to the Utah study by Borg (1965) gives in both cases exactly the same pattern of results. In any case, however, the differences are small but systematic.
2) As regards the process data they in the first place covered the actual instruction time for different units during the school year as reported by the teachers. Due to technical reasons (Dahllöf, 1967, ch. 5) only the relations between the positively selected and unselected groupings could be investigated. Here not only significant but also big differences were found. The main result implies that approximately the same achievement level (or a slight excellence in favor of the positively selected group) is reached through a quite different and much shorter instruction time.
3) A comparison between the composition of the standardised achievement test battery also reveals a rather low correspondence between A and P, the tests measuring only very basic elements. By comparing the proportion of items in the test with the instruction time given to the corresponding elements it has been possible to develop a quantitative measure of the content validity of the tests. Although the figures differ somewhat between the grades, they are low and especially for one of the systems. This means that the instruments used are not equally fair to the systems (and their objectives) under comparison.

The analysis of process variables has thus changed the picture of the grouping problem according to Fig. 5, in which the units have been divided into two categories, elementary ones (U_E) and advanced ones (U_A). With these results as a starting point it has been possible to develop a theoretical model at the macro-level about the instruction process in ordinary classroom teaching which in its turn can be translated into a model for individualized teaching. In this model the criteria and mechanisms for steering the teachers' instruction over the school year play an important role (Dahllöf, 1967, ch. 16-18). Here it may suffice to summarize that the process-variables have emerged as very important keys to a better understanding of the relationships between attainment and frame-variables. Without any data on the actual process behind the reported test results, attainments are quite difficult to interpret, since the same result may be acquired in many different ways and at least with rather different quantities of work and also with different methods. As is readily understood from ordinary

Fig. 5 The Role of Process-Variables for Interpretation of Fig. 4. Source: Dahllöf (1967)



psychology of learning, process data combined with knowledge of the basic characteristics of the group under instruction seem rather easily to permit a prediction of the final achievement level. Other things being equal, knowing the process also implies knowing the results, while knowing only the results gives no information regarding the educational process.

Conclusions Regarding Relevance Analysis and Content Validity

It may be argued, indeed, that there are many other sources than school instruction to be dealt with, and this is true. But if we as researchers in comparative education are interested in the effectiveness with which the school system is operating - from the point of view of achievement, attitude formation, personality development or even with regard to time and costs, utilisation of teachers' time, etc. - then we apparently cannot be satisfied in the long run by only testing end results in terms of more or less conventional standardized achievement and attitude tests. If we ever are going to understand and explain the relation between the different arrangements and other frame conditions on the one hand and the educational outcomes on the other, two main requirements need to be fulfilled:

1) The evaluation instruments must have full relevance as regards the objectives, actual content and interaction that takes place within the school system under study. On the knowledge side this is equivalent to a requirement of content validity as well as a multidimensional evaluation, so that systems under comparison have equal opportunities to show their merits and demerits. It also implies that merits in one respect may be assessed against demerits in others in a quantitative way.
2) We must study the educational process itself under a sufficient long time in order to understand how the different frame factors or instructional methods are operating in the classroom. Since we in this case are dealing with classes

and categories of pupils and teachers as our research units (and also with school-year or even a couple of school-years as well as many different subjects and aspects of the educational objectives at a time), we cannot for the purpose of comparative education, and especially not at the cross-national level, go to an analysis of the teaching process by applying the standard observation methods only - direct observation or television recording of classroom situations - that are so useful for other research purposes as well as for teacher training. Most of these methods can be characterized as micro-analytical, while the comparative problems we are dealing with here in the first place need methods that cover the educational process in quantitative terms especially with respect to time spent on different elements for different pupils. Also the instructional methods that have been applied have to be assessed. But all this still has to be done on a macro-level and under the requirements of representativity and full relevance for the systems under comparison.

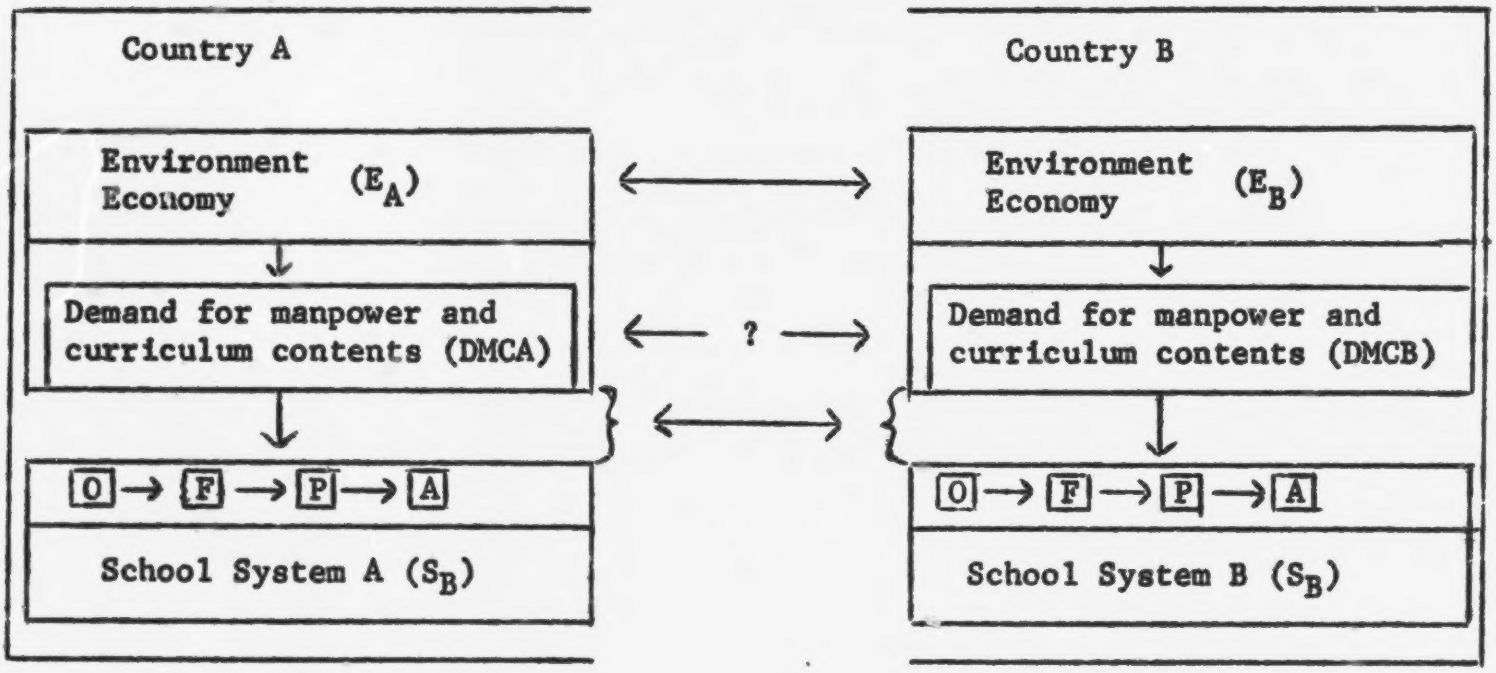
These considerations seem to lead to the conclusion, that further extensive cross-national studies ought to be supplemented by intensive investigations when two or three systems (countries), chosen with respect to some characteristics in O - and/or F-variables, are compared with the teaching process as the main dependent variable. Teachers will then constitute the response units. The more such a study could test hypotheses as to the general relationships between F and P, the better it would be from a theoretical point of view and the more it will promote a general theory about the role of the school systems as functional entities. Such kind of research is, of course, more easy to do in areas within which the school system is relatively homogeneous. Perhaps countries with a highly centralized school administration are to be preferred. It may also be questioned if not the studies in Mathematics hitherto performed by IEA would constitute an excellent starting point for such a follow-up study in some of the countries with much more stress on the direct assessment of process-variables than has been possible in the first report.

The Fitness Problem

Defining the Social Problem. The problem of fitness, as here defined, refers to the relation between the curriculum of the school system and the demands made by the society of which it is a part. In a comparative study as outlined above it may hypothetically be assumed that one of the systems is showing better attainments in a consistent way and that there are corresponding and meaningful differences between the systems as regards objectives and instruction process. However, this still does not tell us anything about which system is to be preferred as a model for future development, since we do not know to what an extent the system is suited to the needs of its own country. The structure and output of the system as regards the number of students and contents of their instruction may be well fitted to the demands in the society at large. Then there is no problem any longer. But the reverse relationship may also be the case: e.g.,an élite system may produce students on a very high achievement level but nobody in the country has any demand for people with that kind of instruction. So we have to introduce a new set of variables in our model. As will be discussed in some detail below, the new variables are in one sense key variables in a problem setting where cross-national or comparative studies are to be utilized in connection with educational planning. At the same time, however, there are no fixed or ultimate criteria about the requirements of a "good" school system from this point of view. That which is to be expected of the school system depends, of course, in the long run upon the general structure of the society at large and especially upon the general trend of development in that society. Thus, conclusions about which of the two school systems is to be preferred are meaningful if, and only if, the two societies are comparable with respect to demand variables as well as to general level and structure of development.

A General Model for Cross-National Comparisons. The considerations in the above section are leading to a model that in a general way may be outlined as in Figure 6. There the school systems are regarded in relation to the general environment in the corresponding countries. The term environment (E) is here taken in a wide sense including the general cultural pattern as well as the general structure and level of economy. Thus, the abbreviation (E) may stand for varying environmental and/or economic factors that need not be defined in any detail here. Anyhow, for planning and evaluation purposes as regards the school system, the E-factors may be broken down into different demands. Thus, there is a manpower demand as well as a demand for a certain curriculum content. These demands may be summarized as DMC, i.e., manpower and curriculum demands.

Fig. 6. A General Model for Cross-National Comparisons between School Systems with Regard to the Fitness of the Systems to the Demands by the Corresponding Societies


Country A
Country B
Environment Economy (E_A)
Environment Economy (E_B)
Demand for manpower and curriculum contents (DMCA)
?
Demand for manpower and curriculum contents (DMCB)
O → F → P → A
O → F → P → A
School System A (S_B)
School System B (S_B)

As is readily understood from Figure 6, two systems may correspond more or less well with the demands made on them at a given time. We saw in the previous section that comparisons as to the function of the systems are meaningful if (and only if) the countries under comparison are approximately similar in their basic environmental and economic conditions. It seems, however, reasonable to believe that the problems created the the E-conditions may result in alternative demand solutions within the same society. Thus, for comparison purposes it seems to be necessary to study the demand-variables directly before drawing any conclusions concerning which of the two school systems that represents the best solution to the demands. Only when the demands are approximately the same, recommendations seem meaningful concerning which of the systems to prefer.

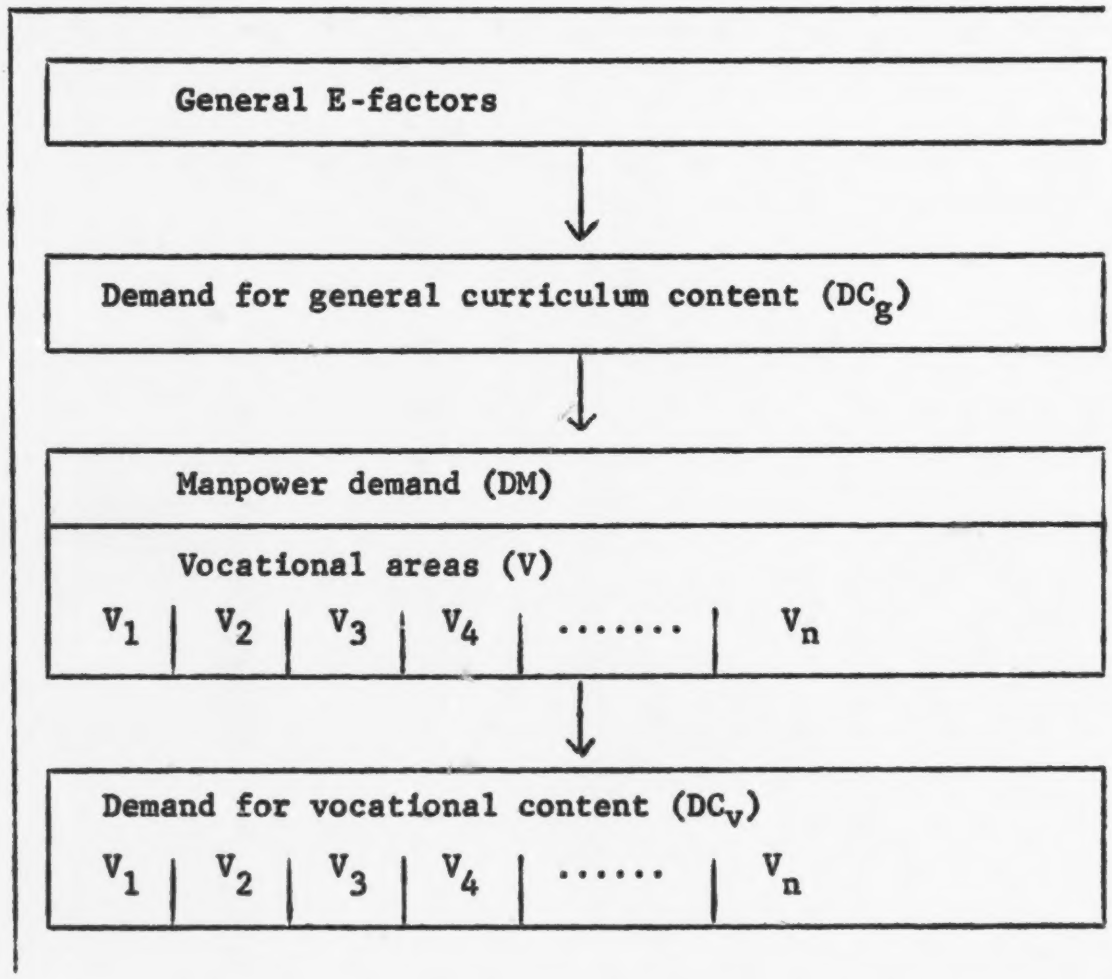
Interrelations between Environmental and Demand Variables. As here conceived, the environmental conditions are consisting of very broad factors as the general degree of industrialization, the general pattern of culture and so on. The demand-variables may be regarded as the operational definitions of those environmental factors that are of importance for the development of the school system.

In Fig. 7 is shown the main structure of the demand area. The demanded curriculum content is divided into two sections, the one for the demands made by society on everybody (or on everybody educated at a certain level, e.g. secondary schools) which is equivalent to general demands (DC_g), the other for demands for vocational purposes (DC_v). The term vocational is here taken in its widest sense, including also demands for further, specialized studies in vocational schools, at the university level, etc. The manpower demand is directly related to different vocational areas. In their turn they may be divided into vocational families and specific vocations but this process is not needed to be demonstrated here.

With some simplification it may be said that the DM-variable answers the question how many pupils - in absolute numbers or relative the total age group - have to be given an education with at least some specialization, e.g.,as technicians, economists, etc. The DC-variables answer the question what curriculum content will be given the different pupils. Thus DM and DC roughly correspond to the quantitative and qualitative aspects of educational planning. It ought to be underlined, however, that manpower and content demands generally cannot be regarded as independent variables, since a manpower demand for a narrow vocational field, e.g. one or two specific vocations, permits (and often actually also implies) rather specific demands on the curriculum content with the corresponding loss of flexibility in a labor market in rapid change. On the other hand, if not some specialization is given by the school system and if there still is some kind of differentiation in the labor market (as it generally is in most countries), the specialization has to be given by someone else, through in-service training in industrial companies and civil service agencies. As the manpower demand is increasing, there will be a growing pressure on the public school system to supply the labor market with at least some kind of specific or pre-vocational training.

Fig. 7. Interrelations between Environmental and Demand Variables

Country A


General E-factors
Demand for general curriculum content (DC_g)
Manpower demand (DM)
Vocational areas (V)
V_1 | V_2 | V_3 | V_4 | .... | V_n
Demand for vocational content (DC_v)
V_1 | V_2 | V_3 | V_4 | ...... | V_n

This tendency is quite evident at the university level and may also be demonstrated in many countries at the secondary school level. With regard to educational planning, the main problem then is to find a proper balance between manpower and content demand-variables, and to translate these demands into a school system, that functions also with regard to the interests and needs felt by the pupils themselves and their parents.

Quantification of Environmental and Demand Variables. The E-variables generally are reported as qualitative statements about the country and its cultural pattern but especially with regard to the economic characteristics many quantitative indices may be used from the study of general economy, labor statistics and so on. It is, however, much more difficult to compare nations in those respects, due to differences in definitions, supply of statistics and so on (cf. Harbison & Myers, 1964). As is reported in much more detail elsewhere, the DM-variables and their relations to E-variables define the main area for economics of education that in recent years has become a research field of its own (OECD).

The demand-variables as to curriculum contents may also be analyzed in a systematic way. In principle this is a field of application of job-analysis for which data collecting methods may be used from questionnaires and rating scales to the critical incident technique (Flanagan, 1954). The general relation, however, between the DC-variables on one hand and E- and DM-variables on the other, has not been subject to very much research but should be regarded as an important field for further research actions at the borderline between general economy, sociology, and comparative education.

Content-Demand Variables and the School System. The relation between the content-demand variables and the school system (DC-O) is the field for what may be called qualitative planning in education or curriculum construction. In general this planning is performed informally through central or local committees, although it may be based to some extent on systematic observation. The activity analyses by Bobbitt (1918) are early examples. Curriculum planning practices are described by Leonard (1956), Taba (1962), UNESCO (1958a, 1958b) and OECD (1966).

Some research projects have been carried out in this field in connection with recent school reforms in Sweden. The first studies concern the curriculum content of the comprehensive school within some school subjects: Mathematics and Swedish (Dahllöf, 1960), Physics and Chemistry (Johanson, 1961) and Civics (Bromsjö, 1964). An English summary of the first project is provided to Husén & Dahllöf (1960). A second series of studies were performed in connection with the secondary school reform (Dahllöf, 1963a). The main stress was then put on the relation between different school subjects and general study habits, but the problems of different aspects of the instruction in modern languages and in Latin were also studied (Dahllöf, 1963b).

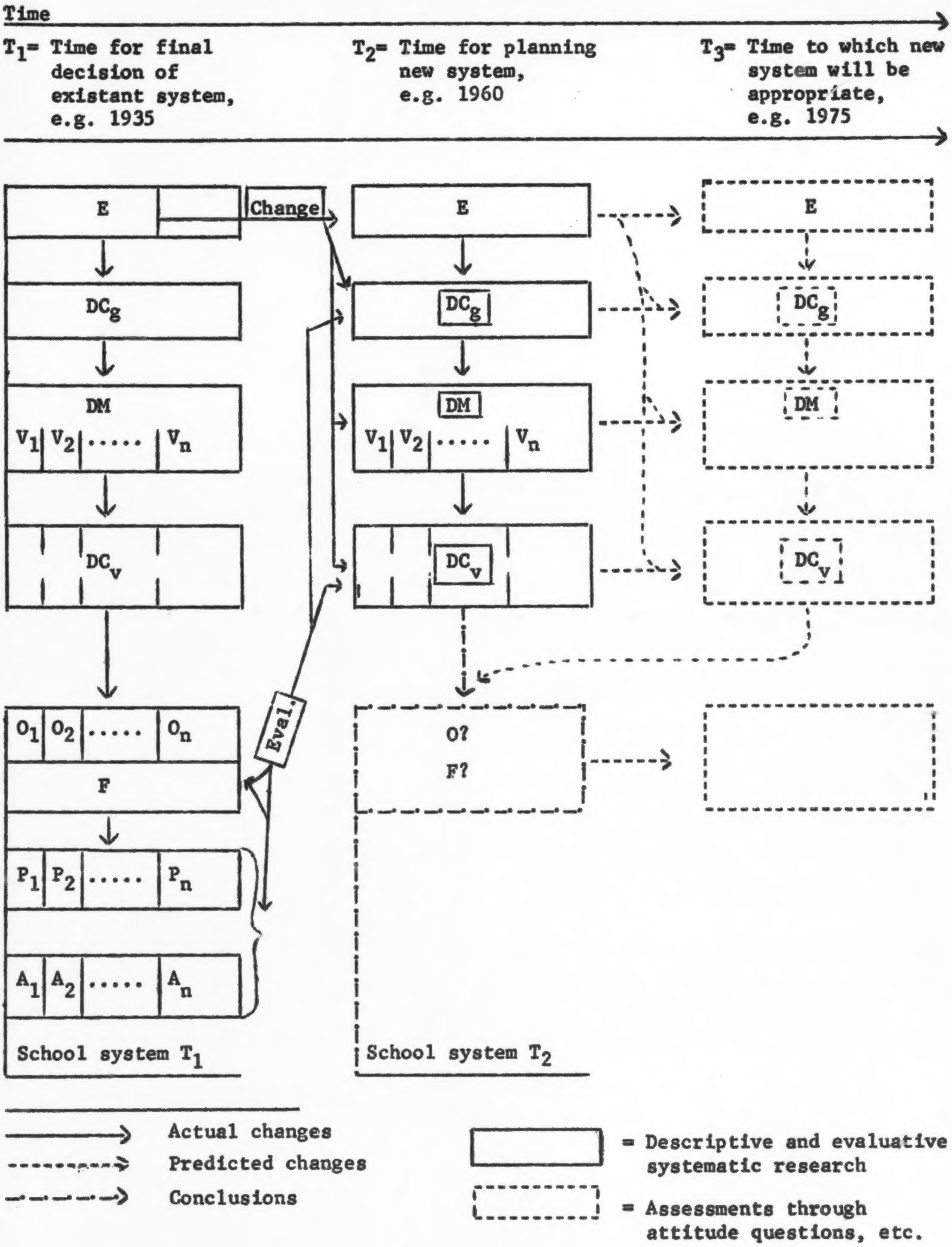
In order to promote translation into curriculum objectives, the demand analysis was broken down into curriculum units and each unit was rated by representatives of the school receiving the pupils. The global nature of the study makes it necessary to avoid detailed observation methods as in ordinary job-analysis, and instead to make use of questionnaires and rating scales. Moreover, a special analysis was also made of the actual function of the old curriculum as to the demands made by the receivers. This functional analysis was carried out through systematic ratings of the standard of the knowledge and performance of the pupils who had left school for further studies or for practical work in selected vocations. In the first studies also achievement tests were given to young workers and clerks in industry and civil service. In addition to the demand analysis of the secondary school, university professors and representatives of industry and civil service also responded to questions regarding the change in demands that would be expected in the future due to the development of the field represented.

The role of systematic studies of the relation between demand-variables and the actual school system in connection with educational planning may thus be summarized as in Fig. 8. Here we are concentrating on one school system that is going to be reformed with regard to the changing demands in society at large. Thus, a time dimension is introduced in both the environmental and school-variables. The system, created at T_1 (say 1935), has to be revised at T_2 (say 1960). This revision is, of course, not only expected to meet the needs of today but also to be appropriate for some time in the future, say 15 years later (T_3), even though this may be accomplished only in an approximate way.

In Fig. 8 the solid arrows emerging from $E_{(T_1)}$ represent actual changes in society that in their turn are giving rise to changes in demand for manpower and curriculum content. The new demands may be assessed through descriptive studies of a sociological kind. At the same time the actual function of the old system is studied systematically in relation to the new demand structure, which means that an analytical dimension is added to the demand descriptions. As a supplement attitude questions as to future changes are added to the research data on the secondary school. When drawing conclusions, the committee was in a position to base its considerations on a fairly wide range of data, but could also use its own judgement as to values and to future development. In the evaluation program of the secondary school a study of the internal function of the system also was included with respect to the recruitment of pupils from different social strata and the mechanisms behind their choice of lines and streams within the school system (Härnqvist & Grahm, 1963). The resultant secondary school reform has been summarized in English by Dahllöf, Zetterlund & Öberg (1966), and by Dahllöf (1966).

From a methodological point of view it ought to be underlined that the problem of manpower demand affects the model in the following way. If there is a need for some specialization with regard to competences at the end of the system, this is taken into account by different objectives (O_1 .. O_n). These objectives

Fig. 8. The Role of Systematic Studies in Connection with Educational Planning


Time
T₁= Time for final decision of existant system, e.g. 1935
T₂= Time for planning new system, e.g. 1960
T₃= Time to which new system will be appropriate, e.g. 1975
E
Change
DCg
DM
V1 V2 ..... Vn
DCv
O1 O2 ..... On
F
P1 P2 ..... Pn
A1 A2 ..... An
School system T1
Eval.
E
DCg
DM
V1 V2 ..... Vn
DCv
O?
F?
School system T2
E
DCg
DM
DCv
Actual changes
Predicted changes
Conclusions
= Descriptive and evaluative systematic research
= Assessments through attitude questions, etc.

may, however, be attained through different patterns of school organisation ranging from division of the pupils into different lines at an early stage to the absence of any streaming at all. The change in the demand may be met by a corresponding change in the number of O's or in the relations between the different O's with regard to the proportion of students who are allowed to direct their studies toward the different objectives.

For comparable O's, changes in curriculum demands may refer to (1) the total number of subjects needed, (2) the relation between different subjects, (3) the total number of units needed within a certain subject or (4) the relation between the main units within a certain school subject. The alternatives (1) and (3) refer mainly to the quantity of instruction, while (2) and (4) deal with the structure of the curriculum. Every combination of these alternatives may of course occur. In the Swedish experiences it seems that the structure problems were the most important, especially the problem of allocation of instruction time to different school subjects and general study habits in the secondary school system. These findings correspond to alternative (2) above.

Some Conclusions for Cross-National Research. Demand-variables as to curriculum contents may well be suited for cross-national research, but for meaningful interpretation they need to be analyzed with due regard to the general characteristics and level of development (E) in the countries under comparison, as well as with respect to the objectives and the actual function of the school systems. Further, it seems to be preferrable to concentrate on the main structure of the curriculum, avoiding going into too many details as to the sub-units within the different subjects. This is to some extent contradictory to the recommendations made in discussing relevance analysis. However, in accordance with these conclusions, fitness analysis (as here defined) ought in the first place to be performed between carefully selected countries. This leads to the conclusion that intensive studies at a macro-level are to be preferred to very extensive ones.

It should be of special interest to try to use the design illustrated in Fig. 8 with at least two countries, following the same trend of development but one some time before the other. The first country is then used as a base for conclusions as to T_3. A functional analysis of the school system of that country may then provide the planning in the second country with much more relevant information than may be at hand through predictions and guesses about the future. Thus, through a systematic analysis, it may be possible (at least in principle) to make fewer mistakes in planning and perhaps to skip a stage of development that has for different reasons been abandoned in the first country. This would seem to be possible, however, only if countries may be found that are comparable both with regard to the general trend of development and if leading politicians in the second country are willing to accept and promote future development in their own country in accordance with the general trend in the first one.

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VI

PROBLEMS OF AGGREGATING SCORES FOR A MEASURE OF TOTAL ACHIEVEMENT

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Value Judgments and Aggregation

From the empirical studies and the tests applied in studies such as the IEA project, we get the i-th country n_i different test scores in mathematics where n_i is the number of pupils who have been tested. The problem now is to construct a measure of total mathematical achievement a_i for the educational system of i-th country. How can we do this? Let us call s_{ij} the score of the j-th individual in the i-th country. A very simple method would be to put a_i equal to the average score:

$$a_i = \frac{\sum_i s_{ij}}{n_i}$$

But this is not a very good measure for example because it does not take account of the fact that in certain countries a higher percentage of pupils stay on at school after the legal school leaving age than in other countries. But also many other objections against this method exist. It is necessary to make a quantitative comparison of test scores of 13-year-old pupils with, say, 18-year-old pupils. For example: a test score of 100 of a 13-year-old pupil counts for as much as a test score of 70 of an 18-year-old pupil. Thus we have to find a common denominator for the different tests. How we can find it is a very difficult question. Assuming that we can answer it we have to attach different weights to the different members of our sample and thereby get a weighted arithmetic mean:

$$a_i = \sum_j \alpha_{ij} s_{ij}, \sum_j \alpha_{ij} = 1$$

$$\alpha_{ij} > 0$$

But why should we take an arithmetic mean? Why not a geometric mean, or a harmonic mean or some other measure like the Euclidean distance from zero in the R^{n_i} - space? This is the question of how to deal arithmetically with test scores which are really ordinal and not cardinal concepts. A test score of 120 simply means that the man is better than somebody who only got 110 points. It might be nonsense to say that a man with a score of 120 is as valuable as two men, one of them with a score of 110 and another with a score of 10. But this is implied by the arithmetic mean approach.

Here we see that the problem of aggregating test scores is a most difficult one. Even if its theoretical side could be tackled in a satisfactory way this need not be so with its empirical side. Clearly the person or institution who is making the aggregation must put into this procedure a lot of value judgments. In a democratic and pluralistic society we would like to see the different value judgments of the different groups reflected in the mechanism of evaluating and aggregating the test score for the purposes of arriving at optimal educational policies. But there arises an empirical (and I think fundamental) question of how to measure the value judgments of the different members of a democratic society. Can we do this by asking them? This, although it is difficult in detail, clearly could be done. But are we really prepared to take their judgments at face value? Most of the experts would certainly claim that the responses to the questionnaires are outflows of certain ideologies and of a general lack of information about the relevant facts. The experts would insist that these people would have answered quite differently had they been better acquainted with the relevant problems, and hadn't had their ideological bias. But who in a democratic society has the right to judge about the ideological bias or lack of bias of opinions? I think that here we come to an unsolved problem of political theory. On the other side I do not see how we can get around this problem when we want to find valid aggregation procedures for test scores.

I do not think that we can escape this problem by concentrating on the economic impact of education and leave aside its other consequences. Economists have tried to evaluate the economic contribution of education by comparing different discounted life incomes of differently educated people. They assumed that life earnings are a good measure of a person's total contribution to the national product. If we accepted this assumption we could in principle--leaving aside problems of operationalization--get an improved judgment about the economic value of certain educational outputs which perhaps are available in the form of test scores. But even here, I believe certain value judgments creep in, apart from the obvious value judgment we started with, namely only to consider the economic implications of educational outputs.

The economic return to any specific kind of education is of course to a large degree influenced by the demand for the different products of education. This demand is quite heavily influenced by the state. We all know that government buys for consumption and investment purposes 20 to 25 percent of gross national product. But this is not even a good representation of government's weight in the market of trained manpower. In Western Germany 35% of those persons in the labor force who have a university degree are employed in the educational sector which almost exclusively is supported by the state (including local authorities). Roughly every second member of the academic labor force of Western Germany is employed directly by the government. In addition I suppose that in industrialized countries those people who are employed by the private firms, etc. and who have had a high amount of education are more heavily engaged in producing goods for government purposes than people with a lower degree of education. This may be true especially in the United States where so much research and development in private industry is financed by government contracts. What would the employment situation be for physicists in private industry if the race to the moon and the arms race would stop? In Western Germany 13% of the academic labor force are doctors and dentists. Most of them are not directly employed by the state. Yet their income is decisively influenced by the government's health policy. It may be appropriate to conclude that in industrialized societies government's position as a direct and indirect buyer of outputs of the educational system is at least as strong as General Motors' position as a seller of automobiles in the United States. General Motors' aim is to maximize profits (or something similar) whereas the demand for educational output by the state is determined by a complicated political process in which the preferences of the public play (or at least should play) an important role. It is not correct that the so-called market value of more or less highly trained people is of higher validity ("more objective") as a criterion for educational policy decisions than the outcome of interviews which try to establish value judgment patterns of the public. For these market values are themselves determined by these value judgments and ideologies.

In writing this rather pessimistic introduction to my paper on aggregating test scores I started from the assumption that we are not prepared to accept judgments and decisions which are formed by tradition or ideology. If we accept these judgments, some fundamental problems disappear, but then also the main motive of the whole IEA project disappears, which, as I understand it, aims at finding rational or "objective" criteria for evaluating educational policies and thereby replacing or validating certain judgments which pretend to be statements about facts without having been empirically justified.

In other words we expect, through the IEA project, to transform the criteria for the evaluation of educational policies. It would be contradictory to base our aggregating procedure (leading to these criteria) upon the old criteria. The only result we can hope for is a statement that in view of the new empirical findings the old criteria can be proved (or cannot be proved) to be self-contradictory. But this is not very much and in addition it probably can be arrived at without this aggregating procedure, since we probably are able to get the ideologically preformed factual statements in such a form that we are able to compare them directly with the disaggregated empirical results. But we want to have more than just proofs of inconsistency: we want to have new criteria developing out of the empirical findings. Otherwise it would not be so necessary to think about aggregating scores to get a measure of total output.

Two different problems of aggregation can be identified: 1) the intrapersonal aggregation and 2) the interpersonal aggregation of scores. We will discuss the second problem, as the more neglected in this field.

Interpersonal Aggregation

In the IEA project there were two main groups: 13-year-old pupils and pre-university pupils (whom for simplicity we may call 18-year-old pupils). How can we compare their achievement scores? One way would be to take a sample which is representative for the whole age group of 18-year-old persons. Some of them still are at school, some of them have left school at an earlier age. There will probably be a significant difference of scores between these two groups. Through specific investigations it should be possible to relate the score of 18-year-old persons who had left school at the age of x ($x < 18$) with the test score they had at the time when they left the school. In this way we can predict from the scores of the school leavers what their score at the age of 18 will be. If a score of 100 of a school leaver at age 15 produces on average a test score of 75 at the age of 18 we put a test score of 100 on a test for 15-year-old persons equal to a test score of 75 for 18-year-old persons. Thus we can reduce the scores for different age groups of school leavers to an achievement distribution within one age group (namely the oldest).

Another method, which probably is simpler, so long as it is feasible, is that we apply the same test to different age groups. I don't know whether it is feasible. Anyway it has not been done in IEA work so far. Having reduced the scores of different age groups to a frequency distribution of scores for a single age group, we now have to deal with the problem of how to order or compare different frequency distributions.

Within a given test group for any pair of tested individuals we can tell which one is higher up in the achievement hierarchy (leaving aside the problem, which arises in practice, that they have exactly the same score --this is no fundamental problem). In other words, we can order the tested group in such a way that the person with the highest score is No. 1, the person with the next score is No. 2, and so on.

For the purpose of comparison of two equally large groups from different countries, say America and Germany, we can put them together into one complete ordering and make statements like the following:

among the	are Americans	are Germans
1) top 25 percent	16	9
2) second 25 percent	11	14
3) third 25 percent	8	17
4) bottom 25 percent	15	10

We put certain weights on the four groups, for example: group 1, 0.5; group 2, 0.3; group 3, 0.2; group 4, zero. We then multiply the American percentage points with these weights and add them up in order to get the American achievement. We do the same on the German side and get in our numerical example the result: America 12.9; Germany 12.1. These weights are of course again value judgments. Similarly we can compare three or more countries as long as the test groups are comparable. And of course we can form any number of subgroups.

The weakness of only using rank orders of individuals for international comparison is evident when we compare the following alternative results:

	Case A (test scores)	Case B
Person 1	160	131
Person 2	130	130
Person 3	100	100
Person 4	70	50

Assuming for example that persons 1 and 4 belong to one country and persons

2 and 3 to the other country the scores of the two countries are the same in Case A and Case B, since only the rank order counts for the scores of the country. Yet everybody would agree that Case A is much more favorable for the first country than Case B.

In other words we are interested in some distance measure between different scores. Let s be the score of a person: then any strictly increasing function f(s) defines a possible distance measure by taking as the distance between two values s_1 and s_2 the absolute value of the difference of f at these points: $[f(s_2) - f(s_1)]$. Which f should we take? This again is a value judgment.

In comparing two countries we simply would add all the f(s) of the different test persons and take the sum as total output. Egalitarian value judgments will tend to choose a function such that the derivative f'(s) (which is always positive) will decrease with an increasing s: for an egalitarian it is much more important to increase a score of 25 by one point than to increase a score of 100 by one point.

An elitist ideology will on the contrary tend to increase f'(s) as s increases. From an elitist point of view it is more important to increase the score of a person from 100 to 101 than to increase the score of another person from 25 to 26.

Another possibility for f is to assume that f'(s) is small as long as s is in the middle range (somehow defined) and f'(s) is large at extremely high and extremely low values. All these different shapes of f reflect certain valuations with respect to the scores and it would be wrong to assume that we could find a shape which can be defended as being objective.

Consistent Valuation

In principle it might be possible to find out what the values are that go into the formation of a national educational system. From this we might be able to find, e.g., a certain function f(s) which for these values is an appropriate criterion of efficiency. It could then be possible--by investigating the actual working of the educational system--to criticize the efficiency of the system under its own efficiency criterion. But even this approach has two difficulties, one of them being fundamental. The less fundamental one concerns international comparability on a high level of aggregation. If different countries have different values and hence different output or efficiency criteria, it is no longer possible to compare directly the overall efficiency of two or more different national educational systems. I will come back to this problem at the end of my paper.

The more fundamental difficulty arises from the fact that a national educational system is not a monolithic structure with a single decision maker at its top. It is rather, like modern societies in general, of a pluralistic nature with many independent decision makers, who usually will not agree on a common basis of valuation. In western countries, for example, universities keep a high degree of autonomy. Their efficiency criterion is usually quite different from that prevailing in high schools or in other parts of the system. Although it is not very likely in practice, it is therefore possible in theory that each subsystem of the educational system is quite efficient under its own valuation standards, but due to contradictory standards the total system is not at all efficient, if we apply any consistent valuation standard. I think that pluralism in the educational system is a good thing. Hence we ought to be careful in using national efficiency criteria at all.

Concluding Remarks

Thinking about the problem of total output of the educational system of a nation I become rather skeptical. What do we want this measure of total output for? The only possible use I can think of is to make statements like this: the total output per dollar invested in education in country A is larger than in country B. But what can we do with such a statement? If we accept it, we have to go further and look into the causes of this difference in efficiency. In doing so we have to return to a more disaggregated analysis anyway. The danger of such a global statement (assuming that we are interested in educational reform and assuming that the countries with a more reformist attitude tend to get a higher efficiency score using our total output measure) concerning efficiency is that this total output measure will be considered not valid by everybody whose ideological outlook is different from ours.

I think we should keep to the disaggregated results of the IEA project and discuss them with whom they may concern. We may have interesting results in the partial efficiency measures of different parts of the educational system. Using them we may convince appropriate people that the system needs changing because of relevant specific reasons which are more compelling than a vague single measure of total output.

VII

AGGREGATE COSTS, OUTPUT AND SCHOOL ACHIEVEMENT

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When considering the application of economic analysis to a new problem, it is natural to look for measures of costs and output. The IEA studies produce scores indicating the level of achievement of individual students in many different schools and in several countries. In this context the construction of aggregate measures of costs and output raises some serious problems.

There are several underlying difficulties:

1. The final educational output is not produced only in the schools but also at home and elsewhere, before, during and after the period of formal schooling.
2. Students are not passive raw material inputs to a process of production. They differ not only in the initial level of achievement, but in their ability to produce the educational output and in their motivation to do so.
3. The decision-makers in the educational system - students, teachers, headmasters, civil servants and parents - do not necessarily have the same aims nor do they face the same signals and incentives.

We shall illustrate some of these problems by contrast with an imaginary world in which they do not exist.

I

Imagine a robot economy: people own robots to work for them, hire them out to others, or sell them for profit. There is a school system for robots. Schools buy untrailed (unprogrammed) robots, train them (provide them with programs) and sell them. In the income statement of each school for a given schooling period we find the following items:

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(1) Sales: Revenue from selling trained robots with life expectancy of _t_ at graduation = number of trained robots times price of trained robots,	$n_e P_e^t$
less	
(2) Cost of replacing the stock of untrained robots = number of untrained robots times price of untrained robots,	$-n_u P_u^{t+Z}$
less	
(3) Depreciation	
(4) Materials	
(5) Salaries to teachers (programmers), etc.	$-C(n_e r, Z)$
(6) Rent and interest excluding item 7	
(7) Interest on the stock of robots	$-\left[(1+r)^Z - 1\right] n_u P_u^{t+Z}$
(8) Profit	$-\pi$
	0

The revenue from sales is the product of the number of robots sold and the prices of trained robots. The school sector is competitive - each school is faced with a given price for what it buys and sells and equal things sell for equal prices. The price of a trained robot P_e^t depends on his expected productivity (net of maintenance costs), the rate of interest and his life expectancy at graduation t.

In order to get from revenue to profits the cost of restocking with untrained robots has to be deducted. The price of an untrained robot is P_u and if the period of schooling is Z, replacements must be bought with a life expectancy of t+Z, i.e., the robots bought have to be Z years younger than the robots sold; this is reflected in the price P_u^{t+Z} (with large t the difference $P^{t+Z} - P^t$ is negligible). In items (3) through (6) we have straightforward direct cost elements. Presumably $\frac{\partial C}{\partial n_e} > 0$, i.e., costs increase with the number of student robots; marginal costs decline over a range and then rise. The same is probably true of $\frac{\partial C}{\partial Z}$: it is negative over a range and then turns sign. The higher the rate of interest, the sooner will lengthening the school period adversely affect costs. In (7) we have separated one element of interest costs that is of particular relevance - interest on the inventory of robots: the longer the period of schooling, Z, the larger this element.

What remains after all these elements are deducted from revenue is profit, π. The school will choose the size of student body, the length of the course and the combination of factors by their effects on profits.

What we here decide to call the value of output is tied to what we call costs. If output is (1), then costs are the sum of (2) through (7). If a more appealing candidate for the value of output is the difference between (1) and (2), then costs are (3) through (7). For the national income accountant the sum (1) through (4) is the value added of the school and it is equal to (5) through (8), the 'income originating' in the school, accruing to the factors directly involved.

In such a system, profits, the difference between the value of output and costs, are indeed an indication of the efficiency of schools in the usual sense; their presence is an invitation to examine the techniques used in the school or other properties which may or may not be applied elsewhere.

If all schools were equal in all respects and there were no barriers to entry into the school sector there would be no profits. Before the introduction of schools robots are sold for a price equal to the discounted value of their expected net marginal productivities over their remaining life time. The discovery that some combination of teachers, programmers, and other facilities can increase the productivity of robots beyond the costs involved is a necessary condition for schools to be established. If the school technology is widely accessible and there are no other barriers to entry into the education sector, profits will not be sustained - competition among schools for the available untrained robots will push up their price and the gains from the discovery of education will ultimately accrue to the suppliers of robots. With free entry into the schooling sector profits will accrue only if schools differ in efficiency.

One of the major problems both in the running and in the analysis of schools is the heterogeneity of robots.

Consider two types of difference in ability among robots: (a) differences in productivity in terms of regular market work, as would be reflected in the rents that their owners could get when they hire them out; (b) differences in the productivity of robots in school. The more productive robots, the 'good students', are those which with a given amount of other resources produce more educational output, or conversely which require less of the other resources to acquire any given skill. More broadly, considering the effects that students may have on one another, higher productivity in school can be defined in terms of total educational output, irrespective of who embodies it. It is immaterial whether these differences in abilities are inherent in the material (innate), the result of manufacturing processes (environmental), or the result of prior schooling.

The market price of the robot with higher market productivity will be higher. A school that considers training an already market-productive robot will face a higher purchasing price and a higher interest charge over the period of schooling. Of two robots with equal school productivities and different market-productivities the school will prefer the less market-productive. If there is the possibility of a variable educational output per student the market productive robot will be kept in school for shorter periods and will get less education. Losses of output in the rest of the economy, the result of the withdrawal of productive robots from the rest of the economy, are borne directly as costs by the schools, showing in their accounts and signaling appropriate behavior.

Of students equal in market productivity and differing in school productivity, schools naturally prefer to buy the 'good students', since they are more profitable to educate; schools will therefore compete for good students and push their price above that of robots of equal market-productivity but lower school-productivity. In equilibrium, the price differential will be such that schools cannot improve their position by changing the mix of students. If schools have access to the same technology it is still true that profits will not be sustained.

If schools are not identical and some of them do make a profit, it is after all inputs have been evaluated by their productivity elsewhere, where 'elsewhere' includes the rest of the educational system. What remains after these costs are deducted from the value of output tells us something about the school as such.

In dealing with robot heterogeneity the problem of identifying the good students cannot be ignored. Schools may try to use measures of students' ability to learn - father's education, intelligence tests, etc. The schools that are more successful in this sorting activity, by luck or otherwise, will make a profit. There may be several levels of schooling so that schools specialize in primary education, secondary, or higher education. In this case most of the profits from sorting will accrue at the first level - the producers at the first level will sell their graduates to the highest bidder and students' performance at the lower level will be used to predict their ability to learn at the higher levels.

We have considered the two types of student ability separately. In fact the two are likely to be correlated and this will tend to reduce the differences in the amount of education that robots or people get. Thus, the student who is more productive in the market may be equally more productive in school so that the higher cost of keeping him away from the market is compensated by his higher productivity in school. Differences in the amount of education given to different robots will not result from absolute overall differences in ability but from the existence of comparative advantage of robots in either type of activity. The absolute level of ability will affect the choice of techniques used in education - the higher the level of ability both in the market and in school, the less will be used of the students' own time and more of other factors.

Schools have a wide choice of subjects to be taught and in the level of achievement to which they bring their students in each subject. The price at which any robot sells depends on the bundle of skills and grades that it achieved in school and whatever qualities it had in it before. The value of the output of the school is the addition to the price for which robots are bought. It is a product of prices and 'quantities'. The prices are derived from the market valuation of various qualities and skills. The 'quantities' are advances made by students along different scales, and various tests can be given in order to determine them. In principle, any level on the scale has its market price and can be used for aggregation. Note, however, that the values of the different skills do not need to be additive, and there may be positive or negative interactions. Prices derivable from the market, are used for aggregating skills both of single individuals and of several individuals.

To summarize: In our world education is viewed simply as a method of increasing the market productivity of robots, and is wholly supplied by profit-seeking organizations competing with each other in the sale of outputs and the purchase of inputs (this does include the robots themselves, whose own motivation is ignored in our world). Their actions generate a system of prices by which outputs and inputs are valued. In this system there is, in principle, no problem in scaling the score on a certain achievement test, nor is there any problem in weighting mathematics against physics. Even more important and fundamental, there are simple rules for deciding who should get education and how much, and for evaluating the education of one student against that of another. Because of this there is in principle no problem in evaluating the output of the education sector.

In the competitive market that we have described, students are bought and interest accrues during the period of instruction. The amount of interest that accrues depends on the rate of interest, the period of instruction and the price of students, a price reflecting their value to the rest of the economy. Students are priced according to their value to others and this price is borne as a cost by the schools. The attempt of schools to save on production costs provides the inducement for talent to be allocated where it can make the greatest contribution to output. The system generates 'correct' signals to the participants, and in addition supplies us, the outside observers, with what we need for correct identification of costs, outputs, profits, and efficiency of the schools after students' qualities have been taken into account.

II

Let us consider now a profit-seeking school system that offers a variety of educational services to individuals, charging them tuition. Students go to school for a variety of reasons - expectation of higher future earnings, increased enjoyment of life, or enjoyment of the educational process. In this system the schools do not face all costs directly - they do not buy students or pay interest on them for the period that they hold them. On the face of it it looks as though the right signals are not being generated. The two types of ability must again be distinguished. Good students (as defined above) will be competed for by schools; they will get scholarships or more education than others for the same tuition. The market is likely to confront schools with different net tuitions for people of different quality, thus again allocating the better students to the schools where their school-productivity is the highest. How does differential market-productivity affect the system? Forgone earnings are costs to the students and to society, but not to the schools. When schools decide on the factor combination with which to produce any given amount of education they will put a zero price on the students' time and minimize all other costs, so that total resource costs for them and the students taken together will be higher. The cost of students' time (i.e. earnings forgone) is not the same for all students. There will therefore be a demand for schools that charge more tuition but economize students' time, and it is not inconceivable that schools will be created to satisfy this demand.

The value of sales of schools in this system is tuition supplied. It is not a measure of the value of education produced by students in the period they spend in school, but only a measure of the value of the services supplied to them by the schools. The total educational output of students depends on their abilities and on the quality and quantity of production of education that goes on outside school. Still, the sales of schools are a measure of school contribution, and school profit is a measure of their efficiency.

III

The actual systems with which we are concerned are very different from those described above.

The social objective function that motivates the school system does not accept the market valuation of different skills, nor does it accept the market weighting of individuals. Moreover, in general there is enough freedom at various levels of the system for different, and sometimes opposing, interpretations of what is to be maximized and what the trade-offs are between alternatives.

Schools are funded to varying degrees by the public either from a local or a national purse. Student tuition does not depend on what they get or what it costs to give it to them. Their allocation to school is very often not of their own choice or the choice of the schools that they attend, and the fact that they attend school at all may be against their own or their parents' will.

It is hard to generalize on the motivation of either schools or students. Perhaps it is plausible to say that schools try to maximize the concept of the educational output given the students assigned to them and the budget of direct costs that it implies, or that they try to minimize direct costs in fulfillment of certain targets. Schools do not, however, bear the cost of the forgone student-productivity and they will therefore not make any attempt to save students' time and substitute other resources for it. Schools are not faced directly or indirectly by the signals for minimization of social costs, nor does the system generate for the outside observer a measure of cost that makes it possible to distinguish between students' ability and the school's efficiency.

Students and their parents act individually on the basis of their own aims, which take into account the internal incentive systems (grades, prizes) created to gear students to the fulfillment of the schools' concept of the social target. Facing their resource constraints and preferences both within the various types of educational output and between these and competing needs and desires, students and households may decide to allocate different amounts of time and other resources to the production process. Whatever the output measure that we choose, it will refer to a change in student qualities which is the outcome of production both inside and outside the school and there does not seem to be any way in which the school output can be separated from other output. Because of the way production is organized, because of the variety of incentives faced by the actors in the system, and because of the importance of non-market transactions, it will be difficult to construct an aggregate and even more difficult to interpret it.

A useful analytical framework at this stage would be that of a production function. In such a framework the time dimensions of inputs and outputs should correspond. The educational output may be the change in achievement during some period for which we try to account by the inputs applied during the period; alternatively, it may be a level of achievement at a given date for which we try to account by the level at an earlier date and the inputs applied between the two dates. With the standard measures of achievement the first alternative is hardly practicable.

The first task of the analysis should be the identification of the quantitatively important inputs. The importance of socio-economic background as represented by father's occupation or education in explaining variation in individual achievement is one recurring finding that cannot be ignored. Conceivably the variable catches the effects of early childhood conditioning, the effects of environment during the school period, and variation in the actual inputs in the home-production of education. While for purposes of prediction we may be content with the explanation provided by the socio-economic background variables, for the purpose of understanding the production process involved and possibly affecting it, an attempt should be made to isolate the home effects that are carried through real resources. These may include space for undistrubed studies, tutoring by private teachers, time for homework and general reading during the school year and in school vacation, time of parents, etc. Most of these inputs can be expected to vary with family income, some with father's education. Some of them could be identified by direct questioning which will center around a time-budget in which education-related activities of students and parents could be separated from the education-competing activities, both in the market and in household duties.

When major inputs are identified, rather than aggregated into a comprehensive cost measure, one should explore their structure. The purpose should be to gain some understanding of the rules of behavior that lead to differences in the scale and composition of inputs applied in school and at home. The economist will naturally stress the role that resource constraints and relative prices play in shaping behavior, particularly where it is subject to control by the individual household. This will naturally stress production within the household and the allocation of time by students and parents.

VIII

THE "FIT" BETWEEN EDUCATION AND WORK

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The title assigned for this paper (and most of the outline of suggested contents) focuses on the human "resources" view of education and, more specifically, on how well the "products" of schools "fit" into the labor market. By the division of labor among papers at this conference, I am relieved of any obligation to discuss the purposes of education other than as an investment in the formation of human producer capital.[1] Furthermore, I take the sense of the assignment to exclude consideration of such societal goals as equalization of opportunity except as that may coincide with productivity goals. In programming terms, the "objective function" is some sort of aggregate income function, whether income maximization at a given time or the fostering of a high and sustained rate of growth in national income (aggregate or per capita).

Whatever the income goal may be, resource allocation is the crucial issue in its implementation, and in several respects. As examples, there is allocation of pupils (or support) to various kinds and levels of schools within the educational system, allocation of the human resources formed by the schools to various occupations, allocation of training between schools and on-the-job learning or training and as between earlier and later years in a man's life. These are in part interdependent allocations. It is therefore fallacious, if all too common, to view the labor market solely as an allocator of finished skills. It is also a former of skills, and demands for the graduates of schools are inextricably enmeshed with skill formation, maintenance, and obsolescence in the post-school years. There are complex relationships between what is taught in the schools and amounts and varieties of post-school employment and training.

Although I will not consider the problems of resource allocation within schools with a view to the formation of particular competencies (as mathematics), questions of allocation among curricula cannot be altogether evaded. On such matters my comments must be general, however. At present we know too little to say anything incisive about one of the basic questions arising from the international mathematics study; how far does academic achievement in mathematics (or any subject) possessed by a working population contribute to economic productivity? To be sure, there is a positive correlation between individual performance in school and subsequent earnings, but the correlation is not right, and other components in such correlations include ability, motivation, initial social status, and, above all, post-school learning and training. It is basic to grasp the fact that any estimate of the "value added" by schooling (for any categories of individuals classified by ability or other personal attributes) tells us about differentials only within a society with a certain mixture or combination of human resources -- and of human with non-human resources. Here, as at many other points, we have to deal with interaction, substitution, and complementarity relationships in the formation and utilization of human resources and the determination of productivity. In fact, the central thesis of this paper is that rapid development requires not "fit" but malleability of human resources, and that human resource formation is a continuing process long after formal schooling has been completed.

Some Approaches and Some Issues

It may help at this point to lay out the key characteristics of two over-simplified approaches of economists and quasi-economists to planning and/or evaluation of human resource allocation.

The Manpower Requirements Approach. This is the most popular approach by far outside the U.S., and among its earliest and most able proponents have been some Americans. It starts with an explicitly dynamic orientation, the ultimate aim being the facilitation of smooth and rapid growth in national income. Until recently, and still among many practitioners, the analysis assumes that there is a single best resource mix compatible with attainment of a given level of national income (or its growth). The task then is to determine what that manpower mix must be for one or another rate of growth, to match these requirements against what may be feasible, and to formulate the optimum strategy for human resources formation accordingly. Failures of prediction are interpreted as imperfections in the estimates of requirements, to be overcome by better data and forecasting techniques.

This approach assumes that the possibilities for substitution between human and non-human resources, and among different kinds and levels of human competencies, are negligible for any given level of national income or its growth. With such assumptions, pricing and market-equilibrating forces would have no relevance, and they are accordingly ignored. This methodology ignores post-school learning and training, treating the products of schools as finished resources that confront a labor market that is determined very narrowly by the technology implied (so it is assumed) by a posited rate of growth in national income.[2]

Manpower planning models vary substantially in the levels of disaggregation to which they carry their estimates (by sectors, occupations, levels and types of schooling). They vary in the ways in which "skills" and education are built into the estimates, and of course in the particular mathematical functions used. They vary also in the bounds within which substitution is allowed full scope but between which zero substitutability takes over. Equally important, all assume that either a particular observed allocation of human resources or that conforming to a regression line derived from cross-economy comparisons is to be regarded as optimal.

Fortunately, some of the manpower planners have been avid data collectors, and these data permit at least partial tests of their assumptions. What, indeed, is a "fit", and how much flexibility is there in the meshing of human-resources supplies and demands? Once this question is given serious attention we are led to consider also its inverse -- "malutilization", "waste", and "incongruence" between educational backgrounds and job contents. This, as we shall see, is also one of the meeting grounds for manpower planners and those who start from rate-of-return analysis, even though they converge from opposite poles.

From the "manpower requirements" orientation to human resource utilization, we have occupational places and candidates of various shapes and sizes. Waste occurs when (a) the numbers of places (demands) of given shapes and sizes are not matched by corresponding numbers of candidates (supplies) and/or (b) some of the supplies have gone into poorly matched places that are too big or too small or the wrong shape -- even though a perfectly "congruent" matching is mathematically possible.

Wastage of type (a) goes back to prior faulty decisions in the formation of human resources. Those faulty decisions are attributed in part to failure to anticipate correctly the ways in which technological change would shift "manpower requirements" in a demand-dominated labor market, in part to asserted gross discrepancies between what men earn and what they produce, and in part to human perversities in preferring psychic to material returns. Wastage of type (b) is a malallocation of available resources that entails failures to attain the maximum current output potential from existing resources. In this naively rigid manpower model, "shortage" is logically defined by job vacancies and "excess" by unemployment after correction for malallocations.[3] Such "excesses" and "shortages" are conceived in simple quantitative terms without comparing costs with benefits or considering rates of pay. While few would stick to so naive a definition of excess and shortage if pressed on the issue, there are many in the profession who operate as if the shapes and sizes of places and candidates were set and there was an unambiguous definition of "congruence". Once attention is directed to utilization of human resources, the existence of optimal allocations for each level of national income can no longer be assumed, however, whether for a base or any other year. This complication raises some awkward problems for the empirical identification of "manpower requirements".

As soon as reality is viewed as containing flexibility, and supplies of human resources are seen as exercising an effect upon adjustments in interaction with demands, the conceptualization and the measurement of "excess" and "shortage" and of "malallocation" become more subtle.[4] Two major shifts of orientation are required. First, the products of the schools cannot be regarded as finished capital goods, once for all. The place of experience and training in careers must be taken into account. Second, it is no longer possible to ignore the pricing process in the allocation of human resources, or to evade analysis of benefits relative to costs. The whole idea of "fit" in the usual connotations of that word becomes misleading and dysfunctional. This is, of course, precisely where the advocates of the rate-of-return and of manpower-requirements approaches collide. For the rate-of-return approach is equally concerned with problems of waste and of malallocation; indeed that is its central concern.

The Benefit-cost Assessments and the Rate-of-Return Approach. In its simplest applications to social decision-making, benefit-cost assessment of investments in human-resource formation is identified with straightforward internal rate of return or present value computations that assume earning streams to be good measures of a man's productivity over a lifetime. Where there are good reasons to assume that this is in fact far from the situation, various attempts at shadow pricing are in order -- whether by linear programming or less formal techniques. However, despite studies of market distortions, little has been done so far to incorporate shadow-pricing into educational planning models.[5] In the advanced countries perhaps we need not have too much concern about these discrepancies so far as application of rate-of-return analysis to educational decision-making is concerned, for most of the market distortions of private as against social returns operate in a direction that strengthens the impetus to institutional reforms that are economically justified even after allowing for the distortions but that are strongly resisted nevertheless for fear of disturbing the status quo and time-honored practices. There are important exceptions, but for the most part I shall simplify by ignoring the problem of shadow pricing and its utility in analysis.

It may be helpful at this point to describe rate-of-return analysis and its cousin, present values. I will start with the latter, as the conceptually simpler variant. Also, I shall consider costs and returns from a societal, not a private, point of view. The direct costs of university education, for example, are the total resources that go into it regardless of who pays the bill: all salaries of personnel involved in education, costs of buildings and equipment and supplies. So-called indirect or imputed cost (a major item) is the cost of diverting student time from wage-earning to the job of learning. For present purposes, the simplest way of handling this forgone income cost, however, is to treat it simply as part of the life-income stream of the secondary graduate, with which that of the university graduate will be compared. Let us use this notation:

Y_{ht} = net earnings of an average university graduate in year t. While he is in university this includes (as a negative item) the direct costs of his education, to be offset by a positive item of any earnings while in school; the net will usually be negative.

Y_{st} = earnings of an average secondary graduate in year t (with similar corrections).

i = an external or criterion discount rate, based upon rates of return available on the best alternative investment.

V_h = the present value (as of year $t=o$) of the net earnings stream of the university man, from year $t=o$ to $t=n$, where t_o is at the age of entry into university (or for secondary graduates the date of entry into the labor force) and t_n is the terminal year of activity in the labor force.

V_s = the present value as of year t_o of the life earnings stream of the secondary graduate.

We then have the definitional equations:

$$V_h = \sum_{t=1}^{n} \frac{Y_{ht}}{(1 + i)}\, t \qquad (1)$$

$$V_s = \sum_{t=1}^{n} \frac{Y_{st}}{(1 + i)}\, t \qquad (2)$$

If V_h exceeds V_s the investment in university education is prudent, as yielding more than the alternative rate (i).

The internal rate of return is another way of looking at the same thing. The internal rate of return (r) to investment in university education is the rate such that $V_h = V_s$. Substituting r for i in the above equation, we have

$$\sum_{t=1}^{n} \frac{Y_{ht}}{(1 + r)}\, t \quad \sum_{t=1}^{n} \frac{Y_{st}}{(1 + r)}\, t \qquad (3)$$

This is a convenient way of summing things up, since we can compare r with various alternative criterion rates (i). Notice, however, that the internal rate by itself gives no prescription for action, and we cannot avoid identification of a criterion rate simply by using r. The internal rate provides a guide when we compare it with a meaningfully chosen i or with r for a different year or a different segment of education or for a different occupation.[6]

While there have been extensive discussions of the proper i to use in this and in other investment assessments (as water resource development or highways), the reasonable range is limited in particular cases. On the other hand, the appropriate value of i will differ substantially across nations at any time and over time in each nation. Rates of return can be computed for various sub-populations -- notably in the U.S. by sex, race, region, and certain occupations. Adjustment of income streams to allow for ability differentials associated with both schooling and earnings is handicapped by inadequate data, but progress is being made on this front. Meanwhile the method is being applied to increasingly disaggregated data by type and level of schooling and to post-school upgrading and retraining or rehabilitation programs.

Seen in the context of an analysis of "fit", the manpower requirements and the rate-of-return approaches differ in basic ways, and these must be examined if we are to relate "fit" to technological change.

1. Rate of return makes explicit comparisons of benefits with costs.
2. It assume that earnings can be taken as a measure of the productivity of the recipient (i.e., of marginal products).
3. Nevertheless, rate of return does not rest on an assumption of optimum allocation of human resources, an assumption often made in using manpower requirements estimates. On the contrary, one of its main uses is the identification of relative excesses and shortages and of malallocations.[7]
4. In its simplest forms, the rate-of-return approach is essentially static, whereas manpower requirements forecasting and associated manpower planning is essentially dynamic. One can partially dynamize the former, however, by adjusting for time trends in earnings streams, thus approximating the stream for members of each age cohort over their working lives. This has been done by applying the same growth rate adjustments to all the education-income streams, an adjustment that raises all internal rates of return to some extent.[8]
5. Whereas utilization of human resources is seen by the manpower forecasters as demand-dominated, as it must be if demands are assumed to be highly inelastic and substitution potentials are very limited, the rate-of-return analyst gives supply effects at least equal weight. He sees utilization of manpower as adjusting sensitively to supplies. Putting this another way, demands for human resources are seen as highly elastic.[9] (It is asserted sometimes that the rate-of-return method also assumes that individuals will be well informed of and respond readily to economic incentives for investment in various kinds and amounts of schooling. Such

assertions mistake the rate-of-return method with prescriptions of free-market adjustments as against planning. The estimation of rates of return and their use as guides in plans for educational expansion that takes the maximization of national income as the goal, are quite independent of how nearly individuals conform to the popular sterotype of the "economic man".[10] Choice between rate-of-return and manpower requirements methods has no logical connection with the issue of directed vs. free market economies; indeed, the first approximate rate-of-return computations were done by an eminent Soviet economist.)

6. Whereas manpower-requirements forecasting attempts to specify the quantitative scale of shifts in the extent and the mix of human-resource formation in schools, rate-of-return analysis specifies only the appropriate directions of change. Both sets of practitioners stress the importance of repeating estimates as feed-back corrections through time.
7. Rate-of-return analysis automatically treats most job experience and on-the-job learning as complementary with schooling. Estimated internal rates of return are actually average returns to schooling with the associated subsequent training.[11] The youth does not move from school to work as a finished product; he continues to learn and to raise his production potential for many years, especially if he has received a comparatively good general education. This boon offsets obsolescence at least in part and fosters both a more rapid change in technology and easier adaptation to it -- for these are two sides of the same coin. So it may be that given sustained growth of an advanced economy, the assumption of highly elastic demands for labor comes quite close to what happens, even if by the indirect routes of changes in the content of learning at work. Manpower-requirements forecasting, on the other hand, typically ignores experience and on-the-job training or views the latter

as a stop-gap measure.

Summing up to this point, wherever they may start, economists who have been concerned with analysis of the linkages (and disjunctions) between schooling and work life ultimately converge on three questions that are much more closely linked than might at first have been perceived: (a) the scope of technically feasible alternatives and substitutabilities; (b) the effects of existing institutions and behavior upon the utilization of human resources, and (c) the scope and rationale of what the OECD is coming to term "in-career" development of human resources.

The Potentials For Substitution Among Human Factors

To discuss these kinds of substitution potentials for a variety of economic situations would exceed the bounds of one paper. I shall limit my comments to recent broadside cross-national comparisons and to bits of evidence from the advanced countries such as those belonging to OECD or participating in IEA. I begin with comparisons in which manpower is categorized by education and the workers' schooling is related to economic level or growth without any intervening considerations of occupation and/or economic sector.

The Education Mix, National Income, and Economic Growth

The first and most discussed formal treatment of direct relationships between educated personnel and economic growth was part of an educational-planning model developed by Tinbergen and Correa and subsequently modified by Tinbergen and Bos.[12] The initial formulation treated numbers of university graduates "required" outside the education sector as a simple linear function of gross national income, and similarly with graduates from secondary schools. When OECD applied the equation to an assortment of 18 countries, ranging from Ecuador to the U.S., the correlation coefficients (using variables in log form) were impressively high: .89 for university and .90 for secondary graduates. But this is in large measure a scale phenomenon; putting total numbers of the labor force instead of numbers of university or secondary graduates into the same equation gave almost as high a correlation (.82). In a later formulation the "required" stocks of top and 2nd-level manpower were expressed as functions ("linear" in log form) of both gross national income and income per capita. Income per capita introduces an adjustment for productivity and carries a negative coefficient. Using this second formulation, the Netherlands Institute analyzed data from 20 equally diverse countries. Again, as we should expect given the scale components, the correlations were high: above .90.

What is of more interest in these comparisons is the wide variation in estimates of educated manpower stocks needed when we set aside the countries with extreme incomes. As one OECD report points out,[13] the differences in stocks of third-level manpower were negligible as among Israel, Greece, Turkey, and Sweden, yet the volumes of production ranged from 1.5 to 11 billion dollars.

Evidently there are multiple problems of definition in comparing secondary and higher education across countries. But even if the elusive problem of "quality" of education is set aside -- or solved by more international achievement studies -- would the regression equations from such cross-national comparisons yield the tidy and definite answers that the manpower planner is seeking? Perhaps instead these equations serve primarily to warn against using regressions to establish the parameters of manpower estimates for individual countries.

In an application of more elaborate Tinbergen-Bos models to Turkey (deriving all coefficients from Turkish data), Blum[14] introduced several modifications that made his results more plausible, or at any rate more feasible. But of particular interest to us is the statement that "the present size of the manpower stock with a secondary education in Turkey would appear to be too small in relation to its level of production". (The italics are mine.) Working on Spain, Emmerji reduced the estimated requirements by introducing declining marginal coefficients. Of this he says:[15]

> The debate concerning technical coefficients is certainly not exhausted by introducing the method of continuous change over time. We have mentioned several times that these coefficients are ambiguous in character; they not only indicate the labor input of a certain quality necessary for a given volume of production, but also reflect to some extent preferences and possibilities of individuals to pursue certain types of studies. These in turn are conditioned by income levels and the educational facilities available. It is in this context that we speak of a "mixture of supply and demand relationships."

Williams,[16] in applying the model to Greece, reduced the implied requirements for second and third level students by switching to the use of an international cross-section norm (for specification of the ratio of manpower of different levels of education to the workforce).

The gist of the conclusions promulgated by the authors of all these studies is to urge more refinement, more disaggregation, and so forth in applying and adjusting the models. But by the same token it can be argued that overall there is wide variation in the education mixes associated with any given level of national income or rate of income growth. Markets do indeed respond to supply conditions in a "mixture of supply and demand relationships".

Skills, Occupations, and Substitutabilities: International Comparisons

In starting with education, we started from the far end of what manpower planners more commonly do. Usually such work begins with analysis of total manpower requirements by sector and/or occupation.

The translation of these schedules of occupations into schedules of educational specifications has been found to be the most difficult and elusive of the manpower planner's tasks. Meanwhile, other students of labor markets, of changes in the labor force, and of growth in productivity have also been investigating these relationships and the changes in them over time. Scholars in Japan and the U.S. have been especially fortunate in the availability of detailed data on the composition of the labor force at all levels.

One of the salient findings that has emerged consistently in the U.S. is that those changes in labor force "quality" that find expression in shifts to increased proportions of men engaged in the more skilled or highly paid occupations are smaller than the "quality" changes attributable to rising educational attainments within occupations. Moreover, from examination of voluminous Japanese data I conclude that the same situation prevails there, probably in even greater degree. Part of this may be due to the fact that occupations carrying the same label have nevertheless changed -- a simple identification problem. But if there can be such smooth and imperceptible changes in what an occupation is, that we have difficulty in identifying the change, perhaps this in itself is sufficient evidence of the adaptive flexibility of the economy in the processes of initiation of and adaptation to technological change.

Recently, and quite suddenly, there has been a spate of cross-national comparisons of occupational distributions and their national income or productivity correlates. Though this is a line of work in which OECD took the lead, let us look first at another study.

Horowitz, Zymelman, and Herrnstadt undertook a vastly ambitious labor in data collection from 24 countries.[17] They took great care in ensuring as much detailed comparability of both "occupations" and "industries" as possible. Their stated purposes were central to the issues of "fit" and substitutability with which we are here concerned. In addition to assembling and codifying the detailed data "from as many nations as possible", their aim was "to test the hypothesis that there is a relationship between the occupational composition of an industry and the productivity of that industry".[18] The hypothesis is stated more fully and with greater elaboration of its rationale as follows:[19]

> Since a given occupational composition reflects a given state of technology (and hence productivity), there is a relationship between value added per employed person in a given industry and the occupational composition of the workforce in the same industry.

The authors go on to define technology in the broadest terms, to include or reflect "a variety of factors such as type of equipment, size of establishment, size of market, product mix and quality, degree of process integration, work practices, and the availability of ancillary services". This all seems a bit elusive, but they carry their hypothesis to the testing ground with the unambiguous statement:[20]

> Only if there is a relatively unique relationship between the productivity level of an industry and the occupational composition of that industry can developing nations use this method of manpower projections with some feeling of reliability.

The hypothesis is stated in an equation for each industry in which value added per worker is predicted as a linear function of the proportions of workers who were (1) professional and technical, (2) administrators and managers, (3) clerical, (4) sales workers, and (5) manual workers. The values of R^2 range from .30 to a maximum of .88 (for lumber and wood products). The authors conclude from these results that:[21]

> "...variations in productivity can be explained by differences in occupational structures; that variations in the proportion of professional and technical workers are a major determinant of productivity in almost every industry; and that the importance of other groups vary from industry to industry and depend on the type of curve that is used to fit the data (i.e. natural or log values). The only (major) occupational group whose variations seem to exert no influence on productivity is that of clerical workers."

They then conclude that "the results of these correlations clearly indicate that the data of the tables in Volume II can be used to project future manpower requirements".

Whether correlations centering around an R^2 of .60 and ranging from .30 to .88 depict a "relatively unique relationship" may be questioned by many, including the present writer, whatever the other values inhering in this study.[22] Furthermore, even if the fits were closer than those observed, we would still have to ask what kind of "manpower" was "required" or, in another perspective, "supplied" to each of the occupations. On this the authors avoid committing themselves, and one must wonder what it means to say that manpower in certain "occupations" is required if what those occupations require remains undefined. In a footnote the authors put it this way:[23]

> Bear in mind that when we refer to occupations we mean functions. We are not evaluating the general capacity or the alternative abilities of the individual who happens to be performing a particular function. In other words, when we say that industry A requires a certain percentage of electricians to achieve a specified level of productivity, we assume that workers assigned the tasks and duties associated with the job description of electrician are in fact reasonably competent electricians and are working as electricians. In effect, we classify a worker according to his duties, as reported by him, and not according to anything else he can do. If a lawyer, for example, is working as a foreman and so reports himself, we consider him a foreman and not a lawyer.

The authors made no attempt to integrate the educational data into their analysis or to assess the degree of "fit" or "congruence" between schooling and occupation.

The OECD has assembled a large fund of data relating to industry, occupation, and education mixes in member countries and in some other countries that are less developed as part of the program on "employment and utilization of highly qualified personnel". The Organization has also analyzed cross-country patterns of human-resource combinations with particular attention to utilization of trained people. These successive studies are becoming increasingly sophisticated in interpretation despite earlier tacit commitments to manpower "requirements" forecasting. Thus one of the recent OECD studies in which coefficients of occupational "requirements" relative to levels of productivity are found to vary substantially remarks:[24]

> The findings in that analysis are negative inasmuch as they imply that there seem to be no fixed coefficients for any occupational category in any industrial structure. This would indicate that a number of substitution possibilities are open as regards capital for labor as well as labour for other labour (italics mine).

Occupational coefficients for engineers and technicians are generally among the most satisfactorily predicted vis-a-vis per capita income across a wide range of societies.[25] Nevertheless, this same study found a range in such coefficients for six European countries, the U.S., Japan, and Argentina from 2 per $million manufacturing production in Argentina (1960) and 3 in the U.S. (1950) to 12 per $million in Sweden and Japan (for 1960). Even if we allow for major discrepancies in occupational classifications, a wide range must remain. The report says:[26]

> It would seem that from these data a manpower planner could not get sufficient information. It would, of course, be feasible to suggest minimum and maximum requirements -- in this case ranging from 2 to 12 Engineers and Technicians per million dollars worth of output. In order to determine the number in between those limits one must have access to data on primarily capital intensity in the industries concerned. But is it really plausible that the manufacturing industry in the United Kingdom is so much more capital intensive than corresponding industry in, for instance, Sweden or Norway?

To an unregenerate manpower forecaster, evidence of wide variability in the educational mix within occupations (at any given aggregate or per capita income or, in more refined analysis, pace of growth) is interpreted to imply either: (a) malallocations with respect to the mix of investments in human-resource formation and utilization or (b) defects in the data. In either case, these pose special "problems" for the planner, especially so long as he adheres to a methodology that ignores pricing and insists a priori upon the assumption of demand-dominated resource use. How is he to determine the "correct" coefficients with which to link occupations to education in some rather ill-defined, near zero-elasticity, "optimal" growth path? A variety in social organization that may lead those uncommitted to detailed planning to rejoice that the world is not quite so vulnerable as the fixities in manpower models might suggest becomes to the manpower requirements protagonist a "negative" finding and a prod to seek ever more refined coefficients. His theoretical base is challenged, he will argue, only by discordances in the relationships between occupation mixes and technology -- a difficult thesis to prove or disprove when one can always have recourse to the proposition that "technique" in production has not been satisfactorily measured in the available data.

This stand of the manpower-requirements analyst leads him to define "requirements" by what men are doing. Supplies in any independent meaning are an awkward nuisance. This dilemma was made explicit in both the studies by Horowitz and his collaborators and in that by Layard and Saigal.[27]

Layard and Saigal, like Horowitz, et al., began by defining "skills" in terms of the functions performed, or occupations.[28] They are very explicit about this, and their reasons for making the choice, which go back to the demand-dominated, manpower-requirements hypothesis. However, their study is more subtle analytically, if less ambitious in the sheer volume of detail. To begin with, they set the technology and factor-substitutability issue firmly in analytical economics by asserting that ex ante there is technologically a wide range of choice and that the combination of inputs chosen to produce a particular output will depend on relative prices.[29] Any particular technique will be chosen only by countries having broadly similar relative prices. They apply this not only to one product but to a total industry mix. They then add that once a technique is chosen, however, this will determine simultaneously the physical-capital/labor ratios and the skill mix in the labor force employed. Assuming that for any one output/labor ratio there is only one appropriate skill distribution and capital/labor ratio, they set up demand equations for each factor of production. In other words, as they sum it up, the overall labor productivity (output/labor) ratio in an industry or for the economy measures techniques of production or the technique mix. They ignore the pace of change. The basic manpower demand equation contrasts with the Tinbergen-Bos equations in two important respects. The dependent variable is a proportion of the labor force instead of an absolute number (and is therefore independent of scale). And correspondingly the key independent variable is labor productivity. (In the first Tinbergen-Bos model labor productivity, or its analog per capita income, had no place, and in their later version it had a relatively small coefficient.) The Layard-Saigal equation was applied for the economy as a whole and for the manufacturing sectors of 20 countries. The closest correlation (an R^2 of .83) was that for proportion of professional and technical workers in the whole economy against the overall labor productivity ratio. The correlations between productivity and proportions of sales workers were negligible. Other major occupation categories came in between.

Layard and Saigal obtained educational data by major occupation categories for 24 countries; they adjusted the data to approximate school-year equivalents before testing relationships between educational attainment levels within occupations as the dependent variables and overall national labor productivity as the independent variable. These correlations were extremely low, with countries dotted widely over the scattergrams. Taking education levels for the whole economy, on the other hand, there were some moderately good correlations with each of their education measures (R^2 values around .50). For the manufacturing sector alone these correlations were again very low.

In brief, the correlations between occupational structure and labor productivity were higher than those between education and productivity. Educational variability within occupations is extremely wide internationally, with remarkably little relation to per capita incomes. As the authors point out, while better data might have raised some of the correlations, they would not have eliminated significant variability in any of the relationships. Especially elusive and relevant to educational planners, is the indication that countries may vary substantially in their "propensities to consume education" at any given per capita income level. It is not only that education may be an effect of as well as a contributor to high income; education may vary substantially as among countries at the same per capita income levels. But at this point we are clearly precipitated into the studies of manpower "utilization".

Human-Resource Investment and Utilization

The impossibility of separating a discussion of investment and utilization of human resources from assessment of evidence about elasticity in factor substitution has been sufficiently demonstrated in the preceding pages. This section is thus also in part about evidence concerning potentials for substitution -- however concealed the technical potentials may be under disparate education-occupation patterns. By-passing more detailed technical analysis,[30] I shall focus broadly on analysis of allocation at two levels and of two kinds.

First, what are the actual occupation-education combinations and what questions do they raise? This is to pick up with the sorts of comparison in the latter part of the Layard-Saigal article, but also to examine some other evidence. Second, what might we say about allocations to investments in formation of human resources at school using the rate-of-return method? In this latter case I will use findings for the U.S. and Japan.

Occupation-Education Matrices in the OECD Countries

Among the most interesting and striking data in the OECD studies are their tabulations of occupational distributions for university graduates.[31] One way of looking at these data is to ask in what jobs university graduates are employed. We observe proportions of university graduates taken up in professional and technical employments to range from 36% in Japan to 81% in Sweden. Next to Japan, the lowest percentages are for the U.S. (60) and France (67); below Sweden is Yugoslavia (78), then Netherlands (77), and Portugal (76). In Japan there are almost as many university graduates in clerical as in professional and technical positions (31%); the highest percentage in that category elsewhere is in Germany (8%). Proportions of graduates who are in administrative positions range from 6 and 7 percent in Great Britain and Germany to 17% in Norway. Seven percent of Japanese university graduates were in manual positions.

Some of these differences are attributable to contrasts in the amount and quality of education (and perhaps also in "native ability") represented by university graduation. University graduates are particularly well trained in certain countries, we are led to believe; they constitute a more heterogeneous group in the U.S. and Japan.[32] We can expect also, a related phenomenon, that the proportions of university graduates who find professional and technical employment will be lower where there has been major stress on education to advanced levels for large proportions of the population, as in the U.S. and Japan. Is there, to this extent, a demand-dominated market in manpower requirements language, so that university graduates spill over into jobs beneath them. If so we should be able to observe such saturation effects by turning the data around to look at them the other way.

When we ask what proportion of professional and technical personnel are recruited from university graduates, we find remarkably little indication of the hypothesized saturation and spill-over effects. The U.S. percentage of top level personnel possessing university degrees is high, to be sure, but the German percentage is higher (53 and 56 percent respectively). Moreover, the Portugese percentage is next (33) and Japan ranks sixth out of eleven countries, despite the relatively high proportion of university graduates in that country's labor force. The proportions for Sweden and Netherlands do conform to expectation, however; their figures are the lowest (14 and 12 percent) and they are consistent with the small proportions of the labor force who are university graduates and the high attainment levels for graduation in those countries. Data such as they can be misleading if interpreted without understanding of national educational systems. Yet we are still left with variations that pose basic questions for both investment decisions with respect to formation of human resources and assessment of how the labor markets of the various countries operate.

We may get some light on these patterns by looking at how university graduates are distributed among professional occupations. Teachers are the largest professional occupation among graduates (except in Norway where engineers lead and physicians and dentists take second place). Portugal is notable for the number who are clergy, Greece for its lawyers. In Japan the leading professional category after teachers (in 1950) was physicians and dentists; in 1960 the Japanese teacher proportion had risen slightly, that for physicians had declined, and the one for engineers was rising. The U.S. distributions were close to average across the nations represented.[33]

The graduates on any given level of the educational system in a country are not homogeneous, clearly differentiated from those on adjacent levels. As the members of this conference know, there is in fact no tight structure of internally homogeneous levels of any educational system even with carefully policed "standards" and examination systems. But unless we were to assume within-level homogeneity, we must expect considerably less than a perfect congruence between schooling and occupational level or type. Only where entry into an occupation is legally or semi-legally tied to particular certificates or diplomas will occupation-education associates be really tidy.[34]

Furthermore, there is nothing incongruent in the movement of lawyers and engineers into management, for example. An education-occupation pattern such as that portrayed for Japan in the OECD report may be an undue exaggeration of what in general must be seen as a healthy looseness of the system; there does seem to be malallocation in the large proportion of university graduates found in clerical work.[35] Note, however, that the Japanese economy has displayed spectacular growth in recent years. Identification of wastage and malallocation of resources requires multifaceted research, including case studies of how recruitment and promotion systems operate.[36] We must also investigate the extent of in-career training and the selection of individuals for it. However, useful clues are provided by examination of wage structures and of rates of return to investments in schooling.

Labor Market Adjustments, Wage Differentials, and Rates of Return

Early in this paper the resource-allocation focus of rate-of-return analysis was emphasized. Along with this goes consideration of relative wages and of changes in wage relationships as indices of changing supplies of and demands for manpower of various kinds and levels. This way of analyzing manpower situations and educational investments is beginning to receive more attention in the recent documents from OECD. Thus we can find scattered through the pages of their reports remarks such as that "remuneration and other indications of the demand for certain types of manpower thus play a very important role in the development of educated manpower in the economy". And in a summary of high points one runs across a citation from Moser concerning the usefulness of analyses of costs and income for each type of training, discounted at appropriate rates of interest.

From the burgeoning literature, theoretical and empirical, apply rate-of-return analysis to investment in human resources I will present a few summary figures. These figures apply to male wage and salary earners in two of the countries participating in the IEA mathematics study: U.S. and Japan. Table 1 presents estimates of internal rates of return to investments in the indicated increments of schooling (as of 1939, 1949, and 1958 in the U.S. and 1961 in Japan).[37] For both countries all of these estimates are for "private" rates of return; they would be smaller in both countries had the full costs of public subsidies to schooling been included.

It is evident immediately that the returns in Japan are generally lower than those in the U.S. with one striking exception: for men with the equivalent of junior-college education. At that level computed rates are exceptionally low in the U.S., whereas in Japan returns are above those on investment in senior secondary schooling. The reasons in both cases seem clear. In the U.S. the first two years after high school has not represented a completion norm, and most individuals who stopped at that level were "dropouts". In median ability they approximately match the median for high school graduates. Their dropping out is to some degree an index to lack of achievement motivation, and many employers interpret it as a negative indicator. In Japan the men of junior-college level were generally not dropouts but had completed a regular course of some kind and received a certificate or diploma. Men in this group were relatively few, they were employed disproportionately in the largest companies, and had participated disproportionately in polytechnic training provided by employers. If anything, they were favorably selected in contrast to their opposite numbers in the U.S.

Table 1. Private Rates of Return to Investment in Education: U.S. and Japan

	Schooling Increments							
	Senior Secondary (1)		1st 2 Yrs. Post-Secondary (2)		Completion of Univ. over (2) (3)		All 4 Yrs. of Univ. (4)	
	U.S.	Japan	U.S.	Japan	U.S.	Japan	U.S.	Japan
1939 (a)	16	-	8	-	-	-	14	-
1949 (a)	20	-	7	-	-	-	13	-
1949 (b)	15	-	6	-	19	-	12	-
1958 (a)	28	-	-	-	-	-	15	-
1961	-	9	-	11	-	12	-	11

(a) G.S. Becker, Human Capital, 1964, pp. 93, 128.

(b) W.L. Hansen, "Total and Private Rates of Return to Investment in Schooling", Jour. Pol. Econ., April, 1963, p. 136; these are before adjustment for income tax.

The most striking contrast between the U.S. and Japan figures is that between rates of return to secondary schooling. These men had completed a regular course of study. Even if we take the minimum U.S. rate of 15%, it is substantially above that estimated for Japan. These high secondary returns in the U.S. carry a sad as well as a happy story; they are high because the differential earnings of the high school graduate over the man with only eight years of schooling are so great; this is at once the clue to the productivity of the U.S. economy and also to our "proverty" problem. The relatively low rate in Japan may be a slight understatement, since workers in firms with less than 10 employees were not covered, and may be disproportionately men without senior secondary schooling; for each schooling level incomes are lower in smaller enterprises.

The Japanese labor market does have certain particular features, including the much-discussed (though perhaps exaggerated) life commitment practice in larger enterprises. It is of particular interest accordingly to identify effects of participation in this latter system upon returns to education. This I have done (Table 2) for three type situations. First is the sets of average life-income streams from which the rates in Table 1 were derived; these are repeated in Table 2 to facilitate comparison. Second, I computed rates from income streams based on the maximum seniority in the firm consistent with each current-age and age at entry to the labor force. Lastly, I show rates of return for a set of minimum-seniority income streams, the income at each age being that for men with less than one year in the firm. The returns for the "maximum-seniority streams" approximate comparisons between the more able and lucky of those at each level of schooling. The "zero seniority streams" select out the least able or fortunate from each category of schooling. Evidently if you are able and lucky, investments will pay very well up to but not beyond junior-college completion. If you were among the less able, the pay-off is about average except for senior-secondary completion, which adds very little to income unless a steady career pattern with one employer can be established.

Table 2. Internal Rates of Return to Education by Career Patterns in Japan (1961)

	Schooling Investment Increments		
	Senior Secondary	Jr. College or Polytechnic	Sr. College Completion (Univ. Degree)
Average Career Path	9	11	12
Maximum-Seniority Streams	13	17	7
Zero Seniority Streams	4	12	11

Time, Uncertainty, and Fit

In an organization with as many able and independent men as OECD, we should not expect monolithic views even where conferences and working papers are summed up in terms such as "the group recommended" or "it was agreed". It should then not be surprising that we can find the following two statements on the same page.[38]

> While there is general agreement that the numbers of highly qualified personnel are not sufficient, it is nevertheless very difficult to make an adequate assessment of this situation....A substantial rise in the level of salaries of the personnel in question has not been observed anywhere, and the rate of return on higher education, to the extent that this can be calculated, is lower than on secondary education.

Then a few lines later we read:

> However, as we have already pointed out, we have no reason to regard substitution as anything but a makeshift solution which may well undermine the productivity of the firms concerned.

Is this double talk, or does it mean something? What seems to have happened is that a rapporteur is attempting to sweep up in one pass two entirely different ways of thinking and kinds of shortage. The first paragraph implicitly accepts, at least in some degree, a type of analytical-empirical economics that makes use of market prices. That is also an economics in which production functions are described in terms of substitution elasticities (high or low, and constant or not); in such an analytical frame the greater the substitution elasticities the more viable the system. In the second quotation the term "substitution" is used in a pejorative instead of an analytical sense -- as a second- or third-best temporary solution in a bad situation. This is followed up by a comment about "latent imbalances" that reveals what the writer must have had in mind. "Latent imbalances, hardly discernible in normal circumstances, become fully apparent when a rapid expansion of research or production is envisaged". The problem is illustrated by large-scale programs launched by the U.S. government, or by sudden cutbacks in such programs. This, it would seem, is a type of situation to which rate-of-return analysis could have contributed very little -- unless such switches are repeated experiences over a normal span of working life. Clearing the cobwebs out of the language, what the juxtaposition of these two statements dramatizes is the importance of generalized basic education that prepares men to learn and adapt, on the one hand, and the importance of in-career training and development on the other. The importance of the latter for returns to schooling is amply manifested in every facet of the data concerning education and income by seniority and size of firm in Japan.[39]

Conclusion

In the opening pages of this paper I stressed the interdependence of three critical considerations in the assessment of relationships between schooling and what a man earns and contributes to production in the course of his working life. These were: the extent of technical substitution potentials and the flexibility of economic adjustments in the utilization of human resources; the smoothness with which the economic and institutional structure allocates men to the jobs in which they will contribute most (optimal allocation); and the extent to which labor market institutions and practices provide for learning and training through a man's career.

Though the last of these topics is vital, I have barely touched upon it. To do it even partial justice would require another equally long paper. This is a topic to which OECD is giving increasing attention. It is also one on which economic theorists have much to say. Under what conditions, for what kinds of competencies, is training on-the-job complementary with schooling, to what extent a potential (or actual) substitute? Can we specify a few "optimizing" rules in this connection? How far do the answers to these questions provide guides to policy in educational planning? How far, rather, do they suggest policies that will influence labor market behavior, either directly or through indirect tax or subsidy measures to encourage in-career human-resource development by private firms? Rate-of-return analysis is only part of the story and only one variant of benefit-cost analysis that can and should be used to illuminate these problems.

Finally, I come back to "flexibility" and "adaptability" as a goal of educational planning. At a recent conference on vocational education, one participant remarked ironically with respect to the growing popularity of this prescription, that we are recommending that our young men should go out looking for a job with the label: "I don't know anything, but I am flexible and adaptable". In fact, however, we are recommending something that requires a lot of learning by youth. In a dynamic world no one can prepare specifically for the job that he will hold in some given technological stage of development. Change is not going to stop when he enters the labor market and start again when he leaves it. I find it strange indeed that manpower planners should have put so much stress on finding the "right coefficients" for some particular target date when the men they are preparing will have to hit a long succession of target dates in their working lives. It may be that Greece has too many lawyers and Portugal too many clergy instead of mathematicians and scientists. But our task as educators is to prepare men not so much for a world of uncertainty as for the absolute certainty of a world of change.

Footnotes to Paper VIII

1. This is not to say that I regard other purposes of education as subordinate. On the contrary, I am concerned by the danger of excessive emphasis on national income and economic growth, especially in the relatively industrialized nations. Nor would I be satisfied merely to add democratization of opportunity as a goal, important though I regard it. In this quantitative age we are in danger of confusing returns with the things we can most readily measure, forgetting that a broader view would incorporate the whole of the quality of life in a "national welfare function".

2. Particular manpower planners, and most notably the least methodological of them all, Frederick Harbison, do stress on-the-job learning and training. However, this has been exceptional among the projectors, and to date so far as I can discover it has been ignored by the manpower model-makers (an occasional, and rare, caveat aside).

3. There is a growing body of illuminating analysis of what job vacancy statistics can and cannot tell us about either the functioning of labor markets or shifts in short-run demand-supply relationships where prices are "sticky" and excess or shortage are implicitly measured at a price. But the more efficiently the price system operates, the less can we learn about relative shortage or excess from the non-price or fixed price models. An ingenious and original use of job vacancy and unemployment data to derive manpower demand coefficients adjusted with technological change is presented in Alan Brown, Colin Leicester and Graham Pyatt, "Output, Manpower and Industrial Skills in the United Kingdom", in John Vaizey, editor, The Residual Factor and Economic Growth, OECD, Paris, 1964.

4. Concepts and associated measurements are discussed in my "Educational Shortage and Excess", Canadian Journal of Economics and Political Science, 29, #4, Nov., 1963, pp. 446-61.

5. The less formal procedures will usually serve better in identifying reasonable proximate shadow prices for evaluation of particular projects or investments. However, where diseconomic constraints are severe throughout an economy or where it is desireable to estimate the social costs of such constraints more complex models may help. Shadow prices are of course obtained as the "duals" in linear programming, but they have a tendency in these models to take on extreme values unless the model is very fully developed and relevant variables are adequately specified. Thus far there are four published linear programming studies focused on educational planning. The first two are applied to empirical data; the second two are as yet mathematical constructs only.

   (1) Samuel Bowles, "The Efficient Allocation of Resources in Education", Quarterly Journal of Economics, Vol. LXXXI, No. 2 (May, 1967). Bowles undertook numerous trial runs with checks for sensitivity of results both to labor market demand elasticities for manpower in each of his education categories and to shifts in technical production coefficients within the educational system. Over a wide range of tests his conclusions for Northern Nigeria remained unchanged. One of them is that vocational secondary education cannot stand up to the benefit/cost test.

(2) Irma Adelman, "A Linear Programming Model of Educational Planning: A Case Study of Argentina", Ch. 14 in Irma Adelman and Erik Thorbecke, Eds., The Theory and Design of Economic Development, Baltimore (Johns Hopkins University Press), 1966.

This is an attempt to blend elements from a conventional manpower planning approach with benefit/cost maximization in educational planning. The objective functions (more than one is used) all pertain to income performance in the total economy, whereas Bowles dealt with the education sector only.

(3) Hector Correa developed a simple linear programming model for a limited problem (constituting only part of the sets of problems tackled by either Bowles or Adelman) in his "Optimum Choice between General and Vocational Education", Kyklos XVIII, 1, 1965, pp. 106-17.

(4) Jean Benard, "General Optimization Model for the Economy and Education", in OECD, Mathematical Models in Educational Planning, Paris, 1967. This is a well developed model the purposes of which are similar to Adelman's, though the details of the model's specifications are quite different. I am told that Benard is experimenting extensively with applications of his model using French data.

6. There has been a vigorous debate over present value versus internal rate of return methods, despite the fact that they are very closely related. Bypassing the technical theoretical and mathematical elaborations, which will have little interest for this conference, it is safe to sum up the practical implications as: (a) Any problem in which the use of internal rate-of-return estimates is justified can also be treated using present value comparisons at various discount rates, but the reverse is often not the case. (b) The two approaches will often complement each other in analyzing the same problem.

7. Note that this is entirely consistent with point 2. Men may receive earnings that match what they contribute under the existing allocation of resources even when they receive less (or in some cases more) than their marginal product potentials with an optimal allocation.

   On excess and shortage see my "Educational Shortage and Excess", Canadian Journal of Economics and Political Science, Vol. XXIX, No. 4 (November, 1963).

8. Even assuming that growth rates to be correct for a particular cohort, this still does not say anything about how cohort streams will shift with technological advance, although the productivity adjustments are in the same general family of dynamic prognoses as those used by manpower requirements projectors. Gary Becker does this and also compares cohort-adjusted streams derived from cross-section data for 1939, 1949, and 1956, 1957, and 1958. (See his Human Capital, Princeton University Press, 1964). Becker's cohorts are still simulated, however. No one thus far has attempted to analyze real historical cohorts (at least to my knowledge), though Finis Welch tells me he has been taking a serious look at this possibility for the United States, and he may now have prepared such estimates.

9. Robinson Hollister stresses the supply vis-a-vis demand theme in his very excellent Evaluation technique de la premiere phase du Projet Regional Mediterraneen, OECD, Paris, 1966. He points to the Yugoslavian report as a notable

exception in the explicit attention given to the supply side of the picture and the effects of expanding education on observed education coefficients in the various economic sectors. This is consistent with the distinctive Yugoslavian approach to economic planning, which has generally started by sectors, asking the question "what can we do with the resources available to us and what are the alternatives?", instead of "what are the requirements for growth-rate X?".

10. The fact that education yields psychic returns that are not measured by money incomes does not matter insofar as the question posed is "what are we getting back in economic returns (as normally defined in growth models) for the resources invested in schooling?" Psychic non-economic returns (and costs) in this sense are no more a part of that question than of the questions posed by manpower planners. Again, this does *not* say that the psychic (or political) returns are unimportant. Rather, it points to the fact that *no* conceivable model that is sufficiently specified to give explicit computable answers is free of serious bias toward selected goals. Models can help organize facts for decision-makers; they cannot give balanced final answers. The day when everything considered of importance can be incorporated in one grand computable decision model for societal development is remote indeed -- which is fortunate, for that day will doom the human spirit.

11. More exactly, it is average returns to schooling and that part of on-the-job learning and training that is reflected in subsequent earnings. On this see: Gary S. Becker "Investment in Human Capital", *Journal of Political Economy Supplement*, October, 1962; Jacob Mincer, "On the Job Training" in the same *Supplement*; and Part III of my "Costing of Human Resource Development", presented at the 1963 meeting of the International Economics Association and published in E.A.G. Robinson and John Vaizey (Eds.) *The Economics of Education*, London, 1966 (MacMillan).

12. H. Correa and J. Tinbergen, "Quantitative Adaptation of Education to Accelerated Growth", *Kyklos* XV, 4, 1962, pp. 776-85; J. Tinbergen and H.C. Bos, "A Planning Model of Educational Requirements of Economic Development", OECD, *The Residual Factor and Economic Growth*, *op. cit.*, pp. 147-70. The Tinbergen and Bos version was subsequently reprinted in OECD, Education and Development, Technical Reports, *Econometric Models of Education* (1965); that volume includes experimental applications of various versions of the model to Greece, Spain and Turkey (by Gareth Williams, Louis Emmerij, and James Blum respectively).

13. OECD, Directorate for Scientific Affairs, *The Education and Utilization of Highly Qualified Manpower* (DAS/EID/66.53, mimeo), Paris, August 16, 1966.

14. OECD, *Econometric Models of Education* (op. cit.) pp. 55-76.

15. *Ibid.*, pp. 33-54.

16. *Ibid.*, pp. 77-94.

17. Morris Horowitz, Manuel Zymelman and Irwin L. Herrnstadt, *Manpower Requirements for Planning*, Department of Economics, Northeastern University, Boston, Dec., 1966 (2 vols., offset). Very pertinent is the review of this endeavor by John Smyth, forthcoming in the *Journal of Human Resources*.

18. *Ibid.*, p. iv.

19. *Ibid.*, p. 6.

20. *Ibid.*

21. *Ibid.*, p. 33.

22. Note, by the way, that in this context significance tests are quite irrelevant; it is the closeness of the fit (and the regression coefficient) that matters, not the probability of deviation from a null hypothesis.

23. Horowitz, *et al.*, *op. cit.*, p. 6.

24. OECD, Directorate of Scientific Affairs, *op. cit.*, (DAS/EID/66.53), p. 37.

25. See,for example,the findings in P.R.G. Layard and J.C. Saigal, "Educational and Occupational Characteristics of Manpower: an International Comparison", *British Journal of Industrial Relations*, Vol. IV, July, 1966, pp. 222-66.

26. OECD, Directorate of Scientific Affairs, *op. cit.*, (DAS/EID/66.53, mimeo) p.37.

27. *Op. cit.*

28. The job-determined definition of the skill mix in the labor force is the approach used by Brown, Leicester, and Pyatt also (see footnote 3).

29. Virtually by definition, the degree of *ex ante* readiness for substitution depends upon how close the ratios of input prices are to the ratios of marginal technical efficiencies. And the input prices depend upon the relative incomes available in alternative employments.

30. In fact Raul Trajtenberg has skillfully analyzed the implications of observed occupation-education matrices for inferences about potentials of technical substitution. See *Change in the Educational Content of the Labor Force*, OECD Seminar on Human Resource Planning, Beirut, Nov. 14-21, 1966 (DAS/FF/66.17, mimeo, Nov. 4, 1966). Another of the more sophisticated OECD attempts to identify characteristics of occupation-education-technology mixes and their relation to productivity as among countries is Sanchez Crespo's *Occupational Structure and Educational Levels* for the same conference (DAS/FF/66.16, mimeo). Crespo used partial correlations, introducing energy consumption as an independent variable to better represent technique. It had little effect on his results, however.

31. The Directorate of Scientific Affairs assembled these data by country in a 300-page statistical annex to the *Deployment and Utilization of Highly Qualified Personnel* (DAS/EID/66.2, mimeo), Paris, Jan. 10, 1966.

32. The IEA study supports the thesis that where numbers enrolled in the last year of secondary school are a high proportion of the age group they will include more with modest ability (or at least performance); we should then expect a greater occupational spread for even optimal allocations of individuals among work activities.

33. These data were presented in a working draft for the OECD meeting on the census study, Jan. 20-21, 1966 (DAS/EID/66.3, mimeo, Jan. 17, 1966, p. 29).

34. Tidy associations are therefore most likely in specialized occupations that control entry, provided the measures of "education" are so specified as to match the entry tickets.

35. These figures may exaggerate the situation, since the rapid increase in university graduates means a heavy weighting of young men. Clerical occupations are frequently the first step toward more responsible positions in Japan.

36. Such empirical work ranges from studies of labor market statistics available in various government sources to special research that goes into firms to analyze skill structures and skill formation, recruitment and promotion, and wage policies. These are exemplified recently by work of Sergio de Castro in Chile, Mark Blaug and his associates in the United Kingdom, Albert Rees, George Shultz, and others in Chicago.

These studies of how the market and firms in them function are to be distinquished from technically relevant non-economic studies. I would classify with the latter the work of the U.S. Department of Labor on the essential skill components of various types of jobs, which is the basis for Richard Eckaus's article, "Economic Criteria for Education and Training", Review of Economic Statistics, May, 1964, pp. 181-90.

Of particular interest to this group, and undoubtedly familiar to may if not most of its members, are the studies by Torsten Husén, Urban Dahllöf and others concerning curriculum, achievement standards, and demands for these competencies as viewed by university professors and by employers of graduates of gymnasia and comprehensive secondary schools in Sweden. These have of course a more immediate and direct link with problems in school curriculum reform than do job-skill analyses *per se*, though Eckaus translated the latter into average educational "requirements".

37. The 1939 estimates for the U.S. cover urban white males in wage and salaried employment only, but those for later years cover all white males and include total incomes. The data for Japan are restricted to male wage and salary workers in firms with 10 or more employees; they exclude the civil service and service industries. For those covered the Japanese rates of return are biased upward, since they assume that part-time earnings while attending school equal individual costs of tuition, books and so forth, which is usually not the case at secondary and higher levels.

38. Report to the Committee for Scientific and Technical Personnel on the Intergovernmental Conference on the Education and Utilization of Highly Qualified Personnel, held in Paris, Sept. 26-28, 1966. The report is under the date January 30, 1967 (STP (67) 1, mimeo, p. 10).

39. Notably, it shows up in the contrasts between steeply rising earnings streams for men at all educational levels from secondary school completion or more who are employed in relatively large firms and have high seniority relative to their age on the one hand, men with less seniority and those in smaller firms on the other. It is interesting in this connection to contrast the points of view that I have found reiterated among progressive managers in Japan with suggestions in the British reports of a pilot study of personnel policies, job contents, earnings and education in the engineering industry

in that country. The Japanese are proud of reforms that shift to a job-analysis system of recruitment and promotion instead of what has been described as the seniority and "career bus" system (ordinary, express, super-express) that has predominated where the "life-commitment" arrangements prevailed. It is argued that the job analysis focus provides a more rational basis for setting pay scales, hiring, and promoting. Not quite incidentally, it also tends to shift more of the responsibility for adult skill development and of retraining to counter skill obsolescence off of the shoulders of the firm. Reporting on their studies in the engineering industry in Britain, on the other hand, Mark Blaug and his associates raise doubts about too job-oriented a labor policy, arguing for long-term manpower development policies in business enterprises that seem very like the career bus pattern. Though both Japanese and British observers stress the contrast between the capacities of small and of large enterprises in these respects, as yet there seems to have been relatively little consideration of the web of interrelationships involved in labor market structures and processes and the nature and extent of training and learning on the job in private enterprise. (For some discussions of these issues see the references cited in footnote 9 and the Summary and Annex papers for the OECD Inter-governmental Conference on the Education and Utilization of Highly Qualified Personnel, op. cit.)

IX

A SOCIAL MODEL FOR CONSIDERING THE EFFECTS OF INTERPERSONAL FORCES ON THE PUPIL AS A LEARNER

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This paper is an exploration in the sociology of learning. It presents a framework describing the position of the student in a variety of interpersonal networks which, presumably, have effects on his learning. Specific variables which operate within each interpersonal network are identified.

The term learning can mean many things. As used here it refers, first of all, to the acquisition of cognitive skills. Such skills are measured primarily through achievement tests in various content areas, although school grades are also used as an index. In addition to this type of content, students acquire certain kinds of attitudes toward learning. Whether they work for sheer intrinsic enjoyment, or for the approval they wish to obtain from others, or in order to avoid feelings of guilt -- such differences in attitudes may affect how much is learned as well as the durability of the learning.

Furthermore, there is evidence that the interpersonal forces to which the student is subject may be important determinants of attitudes toward the learning situation. For these reasons I shall focus both on the acquisition of cognitive skills as well as upon attitudes toward learning.

A Social Model in Comparison with Other Models

Approaches used in the study of determinants of learning may be psychological, sociological and social psychological. The psychological approach accounts for the bulk of research. Studies of this type view the individual as a system of abilities, skills and personality traits. Individual differences in these factors are then related to individual differences in learning. Notable here is the interest in the effects of personality insofar as they transcend the characteristics of social environments. Illustrative would be a study assessing the relationship of achievement motivation to learning in different schools. If achievement motivation is a significant predictor, it should be related to a measure of learning across different school environments.

The sociologist, on the other hand, investigates the characteristics of social environments in relation to learning. Such studies are of two types. The first considers the effects of role relationships. An example would be a study of the student-teacher relationship in which the congruence between student and teacher definitions of the student's role is measured. The association between congruence and level of achievement may then be assessed. One might find that the greater the degree of congruence, the higher the level of achievement.

A second type of sociological study considers the effects of various ecological and demographic characteristics such as social class, sex of the student, and religion. These factors are related to academic performance because they symbolize certain uniformities of personality. That is, positions in the social structure such as social class and sex tend to produce certain similarities in personality among the occupants of these positions. Some of these personality characteristics are, in turn, related to academic achievement. Studies of this type are thus related to the psychological approach. They are distinctively sociological, however, because they show that personality characteristics pertinent to achievement do not have a random distribution in the population; rather they tend to be associated in a systematic manner with positions in the social structure.

The social psychological approach considers how individual differences in personality interact with properties of the social environment to affect learning. Thus, certain personality characteristics may lead to high achievement in some social settings but not in others, and some kinds of social environments may be conducive to high achievement for certain types of personalities but not for others. For instance, in some schools the student peer group may value social activity more than it values intellectual commitment. While this may have the general effect of decreasing the overall level of academic achievement, this effect will be greater for some students than for others. Students who have very strong needs to be popular will, presumably, be affected to a greater extent than students who are more independent of the judgment of their peers. In short, individual differerences in personality interact with general features of the social environment so as to affect student learning to different degrees.

In the ensuing discussion I shall focus primarily upon the properties of role relationships as determinants of learning. Within this context, however, the effects of psychological and social psychological factors will often be discussed.

Theoretical Considerations: Role Analysis

In order to identify the interpersonal forces affecting the pupil as a learner, it is useful to consider him in terms of the major networks of roles with which he is involved. The analysis of role systems has benefited greatly from the work of Robert K. Merton (1957) and Neal Gross and associates (1958). It is perhaps evidence of the increasing consensus in sociology concerning the meaning of basic concepts that Merton and Gross have arrived at rather similar formulations. However, I shall utilize the work of Gross and associates because it has been more fully developed, and because they have demonstrated the utility of their formulation for empirical research.*

To introduce this perspective let me first present a terminology of roles. The basic element in Gross's framework for role analysis is that of position, "the location of an actor or class of actors in a system of social relationships" (p. 48). Such terms as pupil, parent, teacher, and peer, denote social positions.

The individual who occupies the position which is the central object of study (in this case that of pupil) is referred to as the incumbent of a focal position. All others with whom he interacts are referred to as incumbents of counter positions. In order to fully describe a focal position one must identify all the other positions to which it is related. For the description of the focal position of pupil we must introduce such important counter positions as parent, peer, and teacher. Each counter position constitutes a sector of the focal position of pupil. Figure 1 presents a model of the pupil-parent, pupil-peer, and pupil-teacher relationships.

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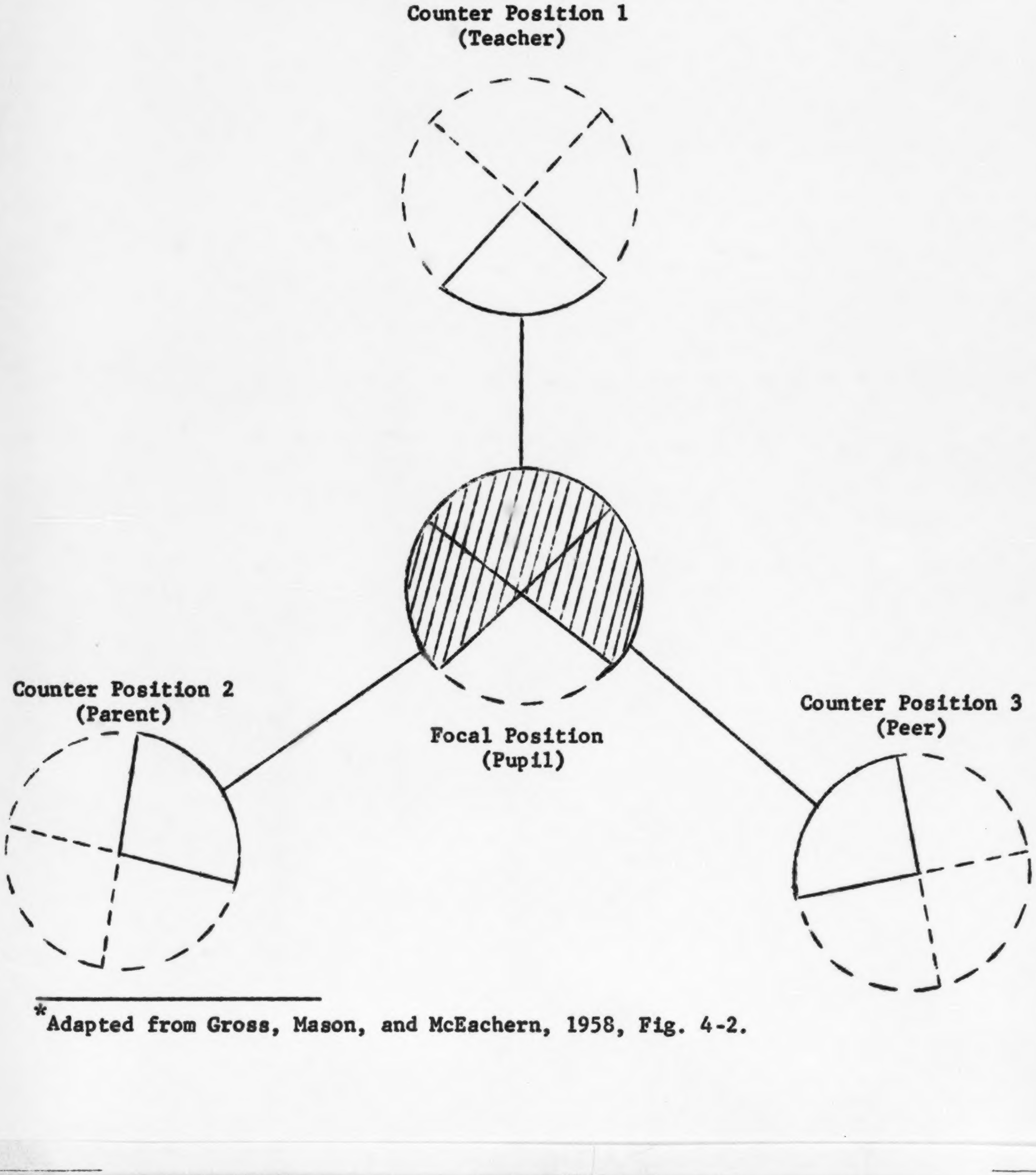
*In the following discussion of Gross's work, I have drawn in part upon a manuscript prepared by Professor Robert E. Herriot of Florida State University.

Fig. 1. A Position-centric Model of the Pupil as a Learner*


Counter Position 1
(Teacher)
Counter Position 2
(Parent)
Focal Position
(Pupil)
Counter Position 3
(Peer)

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*Adapted from Gross, Mason, and McEachern, 1958, Fig. 4-2.

The concept of social position refers only to the location of an actor in a network of positions. Nothing has been said about the expectations and behaviors by which a role is actually described. Networks of positions can be analysed with respect to expectations (how the incumbents of the positions should interact with each other) and behavior (how they actually do interact with each other). In Gross's terms a role is more than just a position, it is "a set of expectations applied to the incumbent of a particular position" (p. 67). Role behavior is "an actual performance of an incumbent of a position which can be referred to an expectation for an incumbent of that position" (p. 67). If student learning is viewed as role behavior, and if the focal position of pupil is linked primarily with the counter positions of parent, teacher, and peer, then the expectations and behavior of the incumbents of these counter positions may be important determinants of pupil learning.

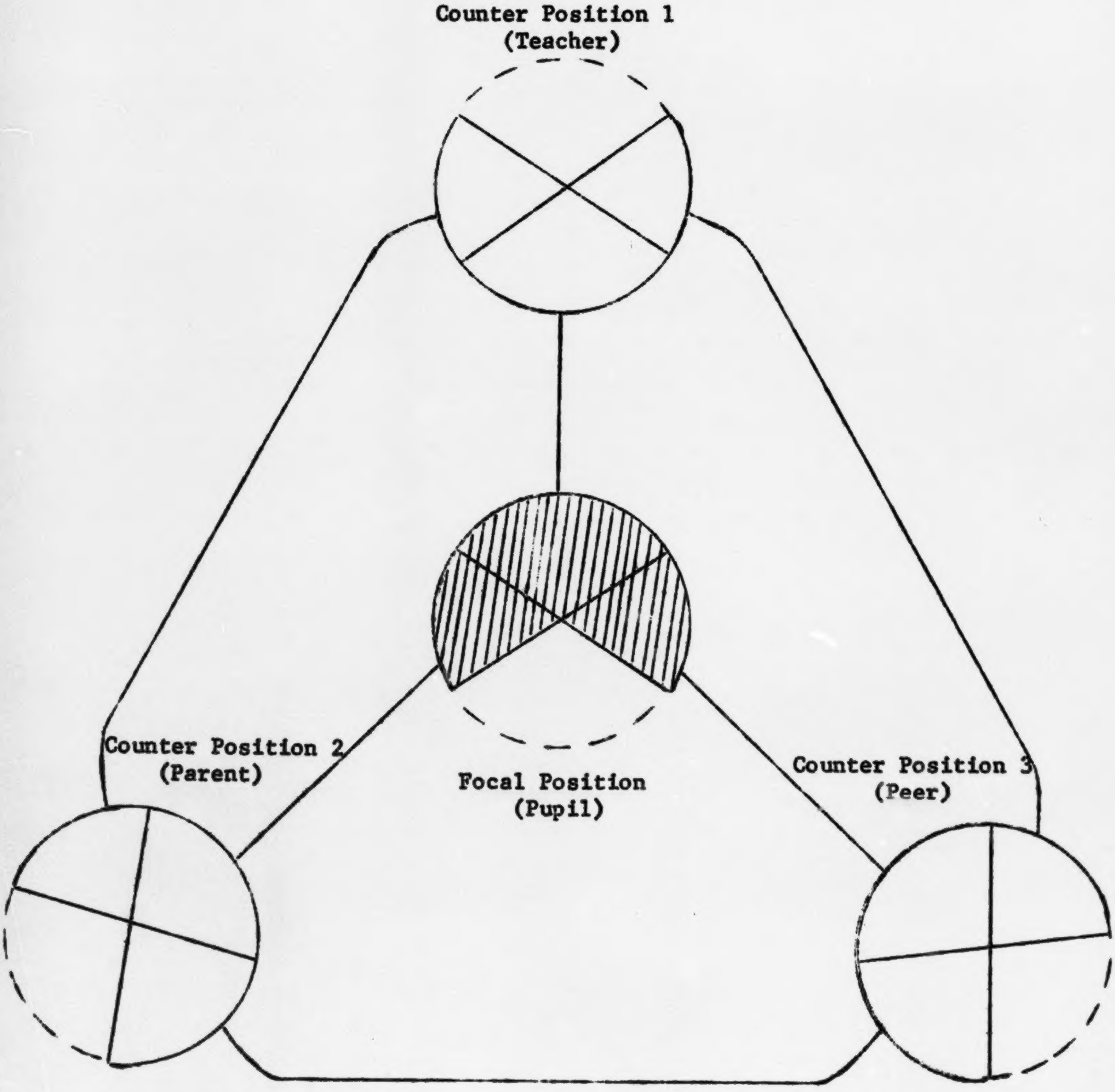
From examination of Figure 1 it is apparent that there are at least three questions which may be asked. The first question is this: What properties of the relationship between the focal position (pupil) and each of the counter positions are related to greater or lesser degrees of learning? In assessing this question, say, for the student-teacher relation, one might compare the teacher's and student's expectations for the student role. Given these expectations as defined by the incumbent of the focal position (pupil) and the counter position (teacher), it then becomes possible to construct a measure of congruence of expectations for the student role. A similar procedure may be applied to the expectations referring to the behavior of the teacher. Thus, there is a measure of congruence of expectation of teacher and student with regard to the definition of the student role, and in like manner there is a measure of congruence for the teacher role. One might wish to assess the relationship of each congruence measure to criteria of student learning. Similar analyses could be carried out for each of the other counter positions which are related to the position of student.

The preceding discussion has considered congruence of expectations for sets of relationships considered separately. Suppose, however, that we consider two further possibilities. In the first we find that the expectations applied by the incumbents of all the counter positions to the student position are in agreement. If such were the case, what we have is a situation where the aggregation of expectations of all the counter positions impinges in a consistent fashion upon the focal position. The second possibility is that in the aggregate the focal position is exposed to conflicting expectations. For example, the expectations which peers hold for the student may conflict with the expectations that the teacher holds for him, and both of these in turn may disagree with the expectations which the parent holds for the student. This analysis raises a second question for research: Is the degree of conflict or congruence in these aggregate measures related to differences in student learning?

The conflict situation also leads to a third question: If different counter positions hold different expectations for the student, how are these resolved by the student? This question would lead us to investigate the extent of ego involvement or "commitment" which the student has in each of his relationships. For example, if the student-parent relationship is the one in which the student is most deeply involved, then we might predict that the parental expectations will provide the direction in which the pupil defines his expectations for himself.

The interpersonal network which may affect the student is even more complex than has been indicated in Figure 1. That model does not consider the relationships among the various counter positions. Figure 2 indicates this added degree of complexity; for here we can see that in addition to the student-teacher, student-peer, and student-parent relationships, there are parent-peer, parent-teacher, and teacher-peer relationships. These relationships may themselves affect the kinds of relationships portrayed in Figure 1. For example, the relationship of parent and teacher may sometimes result in the parent redefining his expectations of what constitutes a "good" behavior in the student role. If this happens, then it means, of course, that the interpersonal environment of the student has been modified, and one might then wish to assess the effects of such modification on student learning.

Fig. 2. A System Model of the Pupil as a Learner[*]


Counter Position 1
(Teacher)
Counter Position 2
(Parent)
Focal Position
(Pupil)
Counter Position 3
(Peer)

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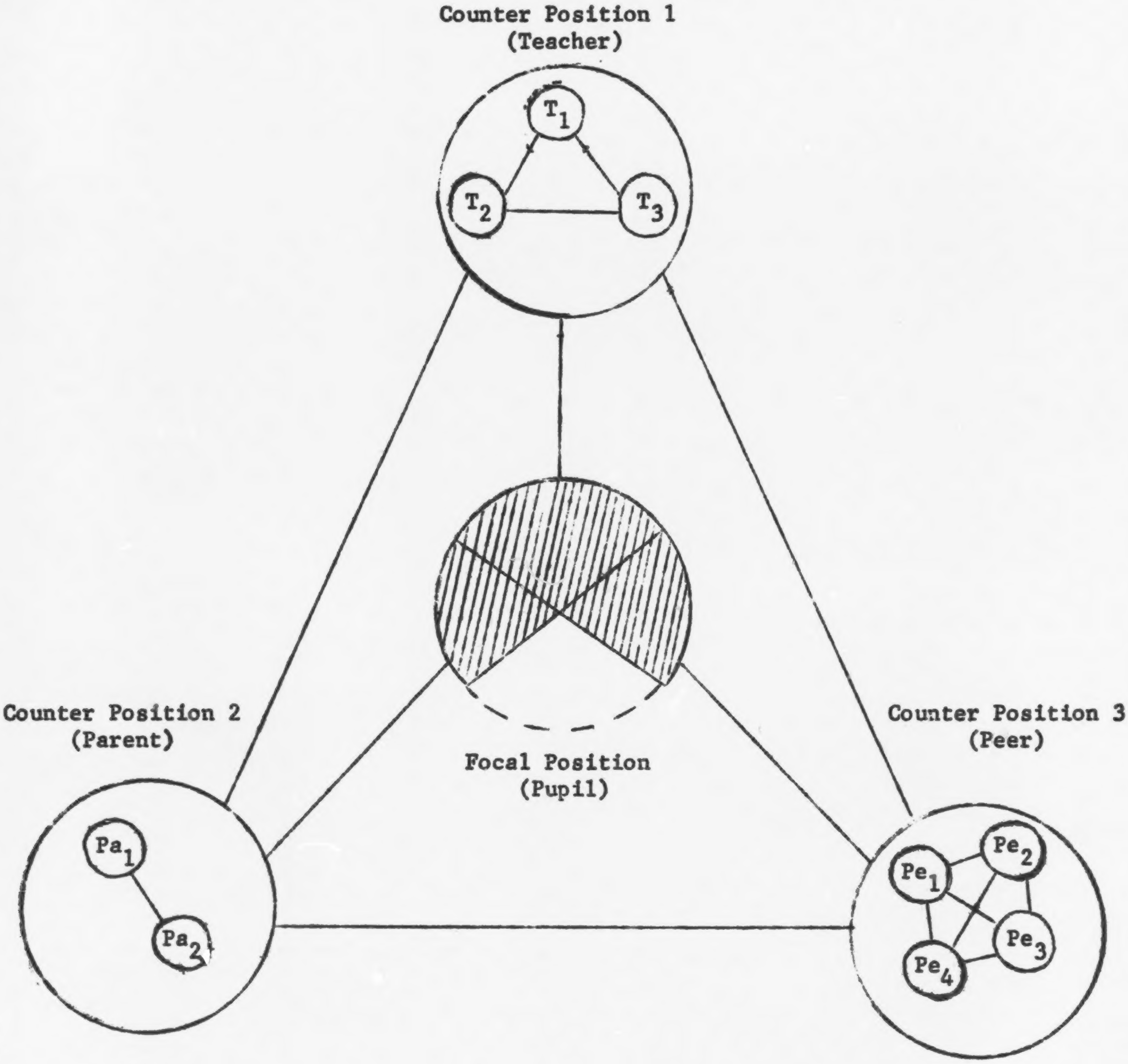
[*] Adapted from Gross, Mason, and McEachern, 1958, Fig. 4-3.

There remains a further set of positional relationships not captured in Figure 2. Teachers have relationships with other teachers, parents with other parents, and students typically have peer relations not just with a single peer, but rather with a group or groups of peers. This level of complexity is presented in Figure 3.

Fig. 3. An Expanded System Model of the Pupil as a Learner


Counter Position 1
(Teacher)
T_1
T_2
T_3
Counter Position 2
(Parent)
Pa_1
Pa_2
Focal Position
(Pupil)
Counter Position 3
(Peer)
Pe_1
Pe_2
Pe_3
Pe_4

One analytic question which arises from Figure 3 has to do with the ways in which relationships among actors who occupy the same class of position (the teacher-teacher relationship) may have repercussions on the student-teacher relationship itself. For example, properties of the teacher-teacher relationship such as extreme competitiveness, and "back-biting" involved in promotions might have effects on teacher morale. Such effects may then reverberate so as to modify the nature of the teacher-student relationship. Analogously, in the family the quality of the husband-wife relationship may have effects upon the child which in turn may hinder or facilitate his performance as a pupil.

Before going on to identify some of the key variables within the various relational systems described above, I would like to summarize what has been presented to this point. I have considered from a micro-analytic point of view the effects of three types of positional relations. First, there are the effects of dyadic relations in which the student is directly involved (for example, the teacher-student relationship). Second, there are effects on the student of dyadic relations where the positions are of different categories and do not include the student (for example, the parent-teacher relationship). Third, there are the effects of dyadic relationships where the positions are of the same category (the teacher-teacher relationship as it impinges on the student). In these three cases we are concerned with the ways in which the properties of the relationship in question affect student learning.

A set of macro-analytic problems has also been described. These problems involve the analysis of two or more sets of dyadic relations considered simultaneously. Illustrative here is the question of the extent of agreement among different categories of positions on expectations defining the student role. Such a measure allows one to describe the degree to which the aggregate of counter positions presents the student with conflicting or converging expectations. Insofar as there is conflict in role expectations, there is then the further question of the priority of role systems. That is, which ones are most influential in determing how the student defines himself?

Identification of Interpersonal Variables

I now want to use the theoretical context presented above in order to locate some of the key variables which operate in the different role networks of the educational system. It should be noted at the outset that the research is very uneven in quality, and as recent reviews point out (Boocock, 1966; Lavin, 1967a), there is as yet no firmly established body of findings which clearly indicates how social factors operate on the student. However, the current state of knowledge attests to the relatively underdeveloped nature of this area of inquiry rather than to its lack of relevance to pupil learning.

Many of the studies I shall cite have not explicitly concerned themselves with indices of learning. Nevertheless, they have been included because their variables seem relevant for the problem of learning and could readily be extended to this question.

It is also the case that there is considerable variation in the educational levels at which studies are conducted, and this, of course, raises the question of the generality of findings. Keeping in mind the question of generality, I have included any study which seems to have identified significant variables, regardless of the educational level on which it was conducted.

The Student-Teacher Relationship

In considering the student-teacher relationship, three major classes of factors will be discussed. First I shall consider the degree of congruence of student and teacher role expectations. Second I shall consider dimensions of teacher behavior and their effects on student behavior. Finally, specific kinds of teaching techniques are examined.

Congruence of Teacher and Student Role Expectations. A number of studies suggest that the congruence between students and teachers in the definition of their respective roles may be related to student learning. Congruence refers to the degree of consensus which exists between teacher and pupil on dimensions of behavior, attitudes, and values. Measures of congruence may be specific or general. A specific measure would assess the extent of agreement between teacher and pupil on concrete behavioral aspects of the student role. A general index of congruence would refer to the similarity between teacher and pupil on some general measure of values or attitudes, not necessarily related to behavior in the student or teacher roles.

Several interesting findings emerge. First there is greater consensus on the definition of the student role than on the teacher role (Yourglick, 1955). That is, students and teachers agree more closely on what is expected of the student than on what is expected of the teacher. The characteristics often mentioned as part of the ideal student role refer primarily to qualities of instrumental significance such as "diligence", "maturity", "cooperative", "intelligent", "dependable", and "integrity".

A second type of finding suggests that similarity between student and teacher on general values is related to higher grades for the student (Battle, 1957). Thus, in addition to the task relevant qualities noted above, similarities on non-instrumental dimensions (such as economic, political, and religious values) are related to student achievement as indexed by grades.

Research also suggests some of the factors which lead to high or low consensus. One of these is social class. The higher the social class the more likely the student is to perceive that the teacher has favorable attitudes toward him, and the more likely the student is to be given a high achievement rating by the teacher. This suggests that as socio-economic status increases, behavior in the student role comes more closely into line with teacher expectations. This, in turn, leads to more approval from the teacher and, thus, to better student performance (Davidson & Lang, 1960).

Another factor which may be related to student-teacher consensus is the sex of the student. Davidson and Lang (1960) found that elementary school girls perceived teachers as having more favorable attitudes toward them than did boys. There was also a corresponding tendency for girls to be rated higher in achievement. The perceived attitude of the teacher was also related to the favorableness of the student's self-conception. Since at the elementary school level teachers are almost always female, this suggests that the behavior and expectations of girls are more in line with teacher definitions of the student role than is the case for boys. It may be that in the case of female teachers the definition of the student role is more heavily saturated with female sex role components than would be the case where the teacher is a male.

A study by Carter (1953) sheds some light on this. He found that the sex of the student and the sex of the teacher interact to influence the relationship between high school algebra grades and achievement test scores in this subject. In classes taught by males the correlation between grades and achievement test scores is higher for male students than for female students. If one considers achievement test scores to be a better index of true learning, then this would mean that male teachers grade male students more objectively than they grade female students. When the teacher is a woman, there are no differences between boys and girls in this correlation. In short, the female teacher is just as objective in grading males as she is females. However, for the male teachers the absolute level of the correlations is higher for both boys and girls than it is in the case of the female teacher. This suggests that the sex of the student has more influence on male instructors, but that above and beyond this, they show greater objectivity in grading. Female instructors seem less objective in grading, but the sex of the student is apparently not a factor influencing objectivity. What this study appears to suggest is that the female teacher uses criteria for grading students which are not too closely related to what the student has actually learned (these might be non-instrumental criteria "taken" from the female role such as compliance, docility and the like) and that she applies these criteria equally to boys and girls. The male teachers, on the other hand, seem to use a somewhat different set of criteria for each sex. They perhaps display greater awareness of sex differences in classroom behavior, and their definition of the good male student may contain different attributes than the definition of the good female student. However, in contrast to the female teacher, the male criteria may contain a higher proportion of instrumental expectations.

While the studies cited above suggest that congruence of student-teacher role definitions may be a significant factor in learning, they are merely suggestive. In the first place, we do not really know whether congruence is a determinant or a result of achievement. On the one hand, the student who defines his role in a manner congruent with his teacher's definition may, because of this, do better in school. On the other hand, the student who does better in school may be more favorably disposed toward the teachers who reward him, and he may thus converge with their expectations through a process of identification.

The traditional demographic variables such as social class and sex are undoubtedly connected with the phenomena of congruence in role expectations. It is the consequences of these variables for the attainment of role consensus which relates them to student achievement. The studies on sex differences seem particularly interesting, and I would suggest that in addition to the study of sex differences in learning, there is a need also to find out more about sex differences in teaching.

Another point raised by these studies has to do with the meaning of the term achievement. The most frequently used index of achievement is the student's grades. If the student who defines his role the way the teacher defines it obtains a higher grade, this does not necessarily imply that such a student has learned more, if by learning we mean performance on some standardized achievement test.

While ambiguities and unresolved questions emerge from the research noted above, I believe that the study of student-teacher role congruence merits further attention.

Teacher Behavior and Student Response. The work in this area has been discussed in Charters' (1967) paper, and so there is no need to duplicate his effort here. I would only say that while there has been much work devoted to the identification of dimensions for the description of teacher behavior, there has been relatively little which attempts to relate teacher behaviors to student response. However, one major attempt to do this is exemplified by the work of Ryans (1960). He finds that certain characteristics of teacher behavior are associated with particular features of pupil behavior. Originality and adaptability are defined as one dimension of teacher behavior. Associated with this is pupil behavior characterized by responsibility and high levels of class participation. A second dimension of teacher behavior is defined as responsible, well-planned, and systematic classroom procedure. Associated with this are pupil behaviors labelled as constructive, responsible, cooperative, and controlled.

It is interesting to note that while characteristics of teacher behavior are correlated with features of pupil behavior on the elementary school level, on the high school level, teacher behavior appears to be less closely related to the classroom behavior of the students. Perhaps at the high school level peer group norms are more influential and may determine student classroom behavior to a greater extent than do teacher expectations for the students. The question of the role of the peer group in determining student behavior will be considered in more detail in a later section.

In these studies, Ryans did not relate student-teacher interaction patterns to achievement. However, such research could be extended to assess this problem.

Teaching Technique and Student Achievement. The role of teaching techniques (for example, the teacher-centered v. student-centered classroom) has also been discussed by Charters (1967). It is my impression that despite the volume of research which has been done on teaching methods, relatively little is known about the effectiveness of different methods for reaching specific objectives. One reason for this is that any technique interacts with the personality of the learner so as to produce different outcomes. A good illustration of this point is provided in a study by Beach (1960). He investigated the relationship between sociability (a personality variable) and academic achievement in four different kinds of learning situations - a lecture class, a discussion group with instructor, a leaderless discussion group, and an independent study group. Less sociable students performed better in the lecture section and in instructor-led groups, while the more sociable ones performed better in the leaderless discussion groups. Thus, this research suggests that teaching technique may be evaluated best when it is viewed within the context of the personalities toward which it is directed.

The Student-to-Student Relationship

Of all the role relationships existing in the educational setting the one which has received the greatest increase in research attention over the last several years is the relation of students to one another. There are at least two reasons for this increased attention. First, there is the experience of sociologists in industry, prisons, and other organizational settings, where the impact of peer groups has been amply documented. In most cases what is shown is that such groups often successfully exert informal pressures on their members which tend to undercut the official aims of organizations. Sociologists have been concerned with extending this type of research to the school setting. A second and related reason is that to conceive of education as something which occurs only in the classroom is too restrictive. What students talk about when they are not in the classroom may be just as important to the learning process. Thus, the climate of student life may serve to reinforce or oppose what happens in the classroom.

Two aspects of student peer groups are most relevant to this discussion. The first involves delineation of the sociometric structure of student relationships and the assessment of the effects of position in this structure on achievement. A second concerns the identification of the value patterns associated with different student peer groups and the effects of these groups as they impinge upon and define the nature of the student's educational experience.

Sociometric Effects. In studies of the student-to-student relationship, the social acceptability or popularity factor is the dimension that, until recently, has received most attention. Such studies map the sociometric structure of the student peer group by assessing the network of friendship choices and by computing the number of choices that are received and reciprocated. In this way, students can be ordered according to their popularity. The relationship between popularity and academic achievement is then observed.

This body of research shows considerable variability in the relationship between popularity and achievement. At the elementary school level popularity tends to be positively correlated with achievement. However, the significance of such findings is open to question, since the relationship often disappears when intelligence is controlled. This suggests that popularity may be a result rather than a determinant of academic performance. That is, at this level peer group norms regarding school achievement may be, in large part, reflections of teacher expectations. Thus, students who best meet these expectations (through high academic performance) may be the most popular among their peers (Lavin, 1967a, pp. 136-137).

At the high school level, the findings are more variable. In some studies popularity is found to be directly related to performance, in others it is found to be unrelated, while in still others the relationship is curvilinear. In the latter case, this means that students who fall in the middle of the achievement distribution are more popular than students at either end of the distribution. What these findings suggest, then, is that measures of popularity do not serve in any general manner to explain variation in achievement.

Effects of Norms and Values. When we turn from the simple consideration of popularity, and focus in addition upon the content of peer group standards, the variability in the role of popularity may be more easily understood. One of the best known studies in this regard is the work of Coleman (1961) on the nature of peer groups in high school and their relation to academic achievement. He found that among students at different high schools, less value was placed on being an outstanding student than on other attributes such as being an outstanding athlete. Moreover, the members of the social elites in these high schools found it less desirable to be seen as an intellectual than did non-members. In addition, the evidence suggests that placing a relatively low value on intellectual achievement actually leads to lower levels of performance. While high status cliques at many schools have explicit norms that tend to prevent their members from achieving closer to their capacity, this does not mean that low levels of achievement are rewarded. What it does suggest is that peer groups do formulate definitions of desirable levels of performance, and that these definitions operate as standards to which students conform in much the same way that work groups in industry have been found to set standards defining desirable levels of productivity. Where standards of this nature prevail, we would expect the relationship between popularity and achievement to be curvilinear.

A recent study by Wallace (1966) helps to specify further the role which student culture plays in academic performance. One of his major concerns was the description of the process by which college freshmen become part of an ongoing campus culture. The process was observed by means of a longitudinal study design.

Several types of analyses were conducted. First, Wallace compared the aspirations and expectations of freshmen at different time periods, thus assessing any changes which took place. Second, he compared freshmen responses with those of upper classmen. Third, he was able to develop indices of each freshman's circle of acquaintances, and from these sociometric data try to relate any changes in aspirations and performance to properties of his sociometric location.

The data show very clearly that over time there is a decline in the grade aspirations of the freshmen. In September, 75% indicated that obtaining high grades was very important to them, but by April, this had dropped to 31%. A comparison of grade aspirations of freshmen and upperclassmen reveals that the overall change in the freshmen was in the direction of greater congruence with the aspirations of the upperclassmen. Moreover, the direction of the freshman change represents a move away from what was valued by the faculty. These findings suggest, then, that freshmen undergo a process of socialization into the attitudes of the more experienced students. In itself, this probably comes as no great surprise to anyone familiar with college life. However, what is of considerable interest is the demonstration that the process of change in aspirations occurs for some freshmen but not for others, and that both the extent and direction of change are related to the student's interpersonal environment as measured by the sociometric data. For example, the more non-freshmen a freshman is in contact with, the more likely it is that his attitudes will change to conform with theirs. Furthermore, if the upperclassmen with whom the freshman is friendly hold aspirations for high grades, the freshman is less likely to lower his own aspirations.

These findings are refined further by the introduction of a psychological variable, the desire to be liked and accepted by other students. This factor seems to mediate the effects of the interpersonal environment. Specifically, where the freshman's initial aspirations are incongruent with those of the upperclassmen, but where his need for acceptance is low, his aspirations are more likely to remain incongruent. On the other hand, if his aspirations are initially incongruent, but he has strong needs for acceptance, he will exhibit greater change in the direction of congruence. These findings take on added significance because it is shown that there is a relationship between the grades students say they would like to achieve and what they actually do achieve.

In summary, this study suggests that the dominant value climate among students has an effect upon their achievement. Moreover, it shows that in addition to the effects of the primary value climate, the location of a student in a peer group characterized by atypical values will also affect his achievement. That is, if a student belongs to a subculture which places a higher value on academic excellence than the average subculture on the campus, the student's actual performance will be above what it would be if he belonged to some other social circle.

The suggestion in Wallace's study that student value climates are not monolithic is a theme which finds greater elaboration in other recent sociological work dealing with student peer groups. A stimulating theoretical discussion by Clark and Trow (1966) is illustrative. These authors present a description of specific types of student peer groups, as well as an analysis of the conditions which generate them.

They suggest that there are two major dimensions of student orientations toward college. One refers to student identification with the college as an organization, while the second is concerned with the extent of commitment to intellectual activities. These dimensions are dichotomized so that we may speak of students as having high or low degrees of identification with their college, and we can think of students who exhibit high or low degrees of intellectual commitment. When these dimensions are then cross-cut, this yields a four-fold classification describing student subcultures. The first type, the academic culture, is seen in those peer groups where students identify strongly with the college and are also strongly committed to the world of ideas. These are the students who work hard and who value academic excellence. The second type identified strongly with the college but exhibits little intellectual commitment. This is referred to as the collegiate subculture. Historically, this has been the dominant peer group style in American colleges. It probably represents the popular conception of student life - some studying, but not too much, and a round of parties, dances, fraternities, football, and so on. A third subcultural form, labelled the vocational, exhibits identification with neither the institution nor ideas. Here the major emphasis is on training rather than on education (in the liberal sense). Such students view college as a place for the acquisition of a set of skills which can be used in the occupational world. The final category, the non-conformist subculture, consists of those groups which are deeply involved with ideas, but little identified (perhaps even hostile) with the college. This is the subcultural type which has in the last few years attracted so much attention in the mass media, particularly in connection with the Berkeley unrest. Also illustrative of their activities has been the emergence of the so-called "free universities" which have arisen on many campuses as a result of student perceptions that traditional course offerings fail to engage significant contemporary issues.

Whether this typology is exhaustive of the subculture found on college campuses and in high schools in the United States is an open question. I think there may be several varieties of each of the four major types. For example, the collegiate culture may be subdivided into "athletes", "party hounds", and so forth. The same may be said for the nonconformists who consist of such disparate types as student activists and hippies. While there may be further variations, I believe that the four-fold typology of Clark and Trow goes a long way toward accounting for the major types of subcultures at American colleges as well as high schools.

While these four subcultures differ in their orientation to academic work, do they also differ in the quality of academic performance? A study conducted by Gottlieb and Hodgkins (1963) was designed to assess this question, as well as to investigate the relation of subcultures to a number of attitudinal criteria. While there are some technical shortcomings in this research, thus creating ambiguities in interpretation, differences which could be attributed to subcultural effects were observed. With respect to academic achievement (as measured by grade-point averages) the subcultures have the following rank order (from high to low): nonconformist, academic, vocational, and collegiate.

There are also differences in attitudes and in occupational plans. Concerning attitudes toward authority, the nonconformists report the greatest change while in college, tending to feel less respect for rules and regulations, while the academic subculture tends to gain more respect. The collegiate orientation shows the least change. In occupational plans, the vocational subculture is mainly oriented to jobs offering security, while the collegiates seem more interested in positions offering a chance for a high income. The nonconformists are the group most likely to plan on attending graduate school.

In summary, the data suggest that the nonconformists obtain the best grades and are most subject to attitude change, primarily in the direction of increasing skepticism, while the collegiates are the poorest students and change the least in their attitudes. Thus, subcultures are influential in determing student grades, attitudes, and aspirations.

In addition to the normative qualities of peer groups described above, there may be formal properties which are related to their degree of impact on the educational experience of the student. First, there is the degree to which subcultures are isolated from one another. Some student subcultures constitute distinct groupings in which interaction outside of the group is rather limited. On the other hand, there may be subgroups in which there is a great deal of interaction across clique boundaries. In this case, one might say that such subgroups have a fairly large number of "part-time" members. I would hypothesize that the latter type of subgroup should exert less influence on its members.

A second property of subcultures is the strength of the pressures which they exert on individual members for conformity to their norms and values. Even if peer groups have well-defined sets of norms and values, some may tolerate much higher levels of individual behavior variations around these norms than others. Here one would expect that the greater the permissiveness of the subculture, the less its degree of influence on the student.

A third aspect of student peer groups has to do with what might be called the "degree of fractionation". This refers to the number of distinct peer groups which exist in a school. Differences between schools could be assessed by computing a "fractionation ratio". This would be a ratio of the number of subgroups to the student population. Such a measure would allow one to compare the degrees of fractionation of student bodies in different schools regardless of size. For example, a student body of a thousand which has ten distinct subgroups would be equivalent in fractionation to the student body of two thousand which has twenty identifiable subgroups. I would suggest that the greater the degree of fractionation, the less will be the influence of any one group on its members. The rationale for this hypothesis is that where there are a larger number of subgroups, there is a wider range of choice for the individual student, and thus, if he finds one group to be unrewarding, his chances of finding another are greater (assuming that they are all equally accessible).

A fourth condition which may facilitate the influence of a peer group on its members is size. Newcomb (1966) has proposed that the condition most suitable for strong peer group influence is the relatively small, face-to-face subgroup where affective ties are likely to be strongest.

From the preceding discussion, it seems clear that the understanding of student achievement will be enhanced if various aspects of peer group relationships are considered, for these relationships may operate to facilitate or impede student learning. In essence, what is needed is, first, assessment of the student sociometric structure; second, the linking of distinctive normative and value systems with the subgroups which are sociometrically observed, and third, investigation of the relationship of subculture membership to academic achievement.

Family Relationships and Achievement

There are a number of respects in which family relationships may influence performance in the student role. I wish to consider two of these. The first concerns the consequences of the parent-child relationship. The second involves the relations of siblings with one another.

Parent-child Relations. Family power structure is one aspect of parent-child relations which has not received much research attention, although it would seem to be a factor related to student learning. Strodtbeck (1958) conducted a study, one of whose purposes was to relate features of family interaction to the achievement of high school boys. He found the power distribution in the family to be associated with certain personality characteristics in the child which, in turn, were predictive of academic performance. In particular, it was observed that the more power the son and the mother have relative to the father, the higher will be the son's score on a test of achievement values. The term, "achievement values", refers to a set of beliefs and goals which, Strodtbeck argues, are important for achievement in the United States. Illustrative are the following: 1) The belief that the world is orderly and amenable to rational mastery, and that the individual is capable of controlling his own destiny; 2) Willingness to leave home in order to "get ahead" in life. The degree to which a boy holds these values was found to be directly related to his academic performance. What is presumably involved here are the effects of one's power on how one views the world. For example, if a child has grown up in a family in which he rarely carries much weight in family decision-making, where decisions are usually made for him, and where he is generally dominated by his parents, he is not likely to end up with the belief that he can control what happens to him in the world. That is, he will probably not view himself as having much potency in the shaping of events. Furthermore, he is more likely to be dependent on his parents. Passivity and dependence are not characteristics which should lead to high levels of academic performance.

A cross-national study by Elder (1965) was also concerned with the role of power in parent-child relationships. Using data from five countries, including the United States, he obtained findings similar to those of Strodtbeck.

In connection with the above studies, it might be noted that their findings help to explain, in part, why social class is so consistently correlated with achievement. Apparently, the distribution of power in the family varies systematically with class position. Sons in lower class families have less power relative to the parents than do sons in middle class families. However, when social class is controlled, the relationship between power structure and achievement values still holds. Thus, class is related to achievement, in part, because of its relation to power. In short, social class is so often found to be related to achievement because it summarizes a variety of other factors which are, in turn, determinants of achievement.

Further evidence of this role of class is seen in work on values and on child rearing practices. Quite apart from variations in power structure, evidence suggests the presence of differences among families in values which lead to differences in educational achievement. Thus, Kahl's (1953) study of educational aspirations of high school boys, showed that among those of high intelligence whose fathers held low level white collar or skilled to semi-skilled jobs, whether they aspired to college was related to the values of their parents. Those who planned to attend college had parents who exerted pressures on them to be ambitious and to realize this ambition through a college education. Thus, while it is true that parental aspirations for their children are class-related (the higher the class, the higher the goals), it is the values and not simply the class position which are the important factors.

Turning to substantive child-rearing practices, Kohn (1959) has conducted research which has direct implications for learning, though he was not explicitly concerned with this question. He found that parents differ in their techniques of obedience training. Some families (primarily blue collar families) view the problem of obedience primarily within the context that the child should learn to respect the authority of his parents. Other families (primarily middle class) view the problem of obedience in the context of what it indicates about the child's internalization of standards and his self-control. One might say that in the former type of family, parents attempt to motivate obedience extrinsically, whereas in the latter type of family, they attempt to motivate it through internalization. To put it another way, the difference is really between inducing the child to conform because he must as against inducing him to conform because he wishes to. The latter type of motivation would seem to furnish a more effective basis for meeting the demands placed upon the student in the school situation, and therefore, it is to be expected that the latter type should lead to more achievement.

The Effects of Sibling Configurations. Another aspect of the family setting which is related to school achievement concerns the sibling configuration in which a student is located. By sibling configuration, I refer to three factors. First is simply the number of siblings in the family. Second, there is the student's birth order. Third, there are the various combinations of brothers and sisters.

With regard to size of the sibship, Bernstein (1958) states that this is inversely related to academic performance; the larger the number of siblings, the lower the level of school achievement. Two facts may help to explain this relationship: First, Nisbet (1961) states that family size is inversely related to socioeconomic status. Thus, large families are significant for educational achievement because they are likely to be of lower social class and lower intelligence as compared with smaller families. However, Hunt (1961) cites evidence showing that the correlation between family size and intelligence holds within all occupational levels except at the very top (where it is possible to afford outside help in the care of children). Thus Hunt's discussion suggests that the effects of family size on intelligence and academic performance are independent of social class. This conclusion fits in with the position of Bernstein (1961) who suggests that the association between family size and intelligence is due to the negative effect of large families on verbal development. In summary, the suggestion is that family size is related to school achievement because the size variable creates different environments which may either nurture or impede the development of aptitudes.

The evidence on the relationship between birth order and achievement is not consistent, although some trends in the literature are apparent. In Terman's (1925) studies of gifted children who came from two-child families, more were first-born than would be expected by chance. In a study (Nichols, 1966) of finalists in the National Merit Scholarship Competition who came from two-child families, two-thirds were first-born. However, among the larger and less select group of students who took the first round of these tests, there was no relationship between birth order and test scores. Altus (1966), in studies of undergraduates at the University of California, finds that the first-born score is higher on the verbal section of the Scholastic Aptitude Test, but that there are no differences on the quantitative section. In short, the general trend does seem to favor the superiority of the first born in ability, but the findings are not unanimous, particularly when one considers specific ability dimensions such as verbal and quantitative scores. What might be said with some degree of confidence is that first-borns are likely to be of higher aptitude than later-borns if one is looking at very high levels of ability. However, at levels below the gifted category, a relationship between birth order and ability is not apparent. Presumably, the same statements could be made in relation to learning.

In addition to birth order, some work implies that the sex of siblings may be an important factor related to aptitude levels, and by implication, to achievement. This work has been motivated by an interest in sex role learning. It indicates that beyond the traditional belief that children learn sex-appropriate behavior through a process of identification with their same sex parent, sibling factors are also determinants of children's characteristic sex role behavior. For example, an analysis by Brim (1958) of data collected by Helen Koch indicates that birth order interacts with sex of the sibling to affect the learning of masculine and feminine roles. Thus, in two-child families a second-born male with an older sister exhibits more feminine behavioral characteristics than a younger male with an older brother. Conversely, a second-born female with an older brother exhibits more masculine behavior than her counterpart with an older sister. The same effect is noted when the older female has a younger brother rather than a younger sister, but it is less striking than for the case of the second-born. In short, the presence of a cross-sex sibling seems to result in the expression of more behavioral characteristics of the opposite sex than is the case where both sibs are of the same sex, and this effect is more powerful on the second-born.

These findings have been interpreted in terms of a theory which, very briefly, runs as follows: 1) People tend to incorporate into their own behavior repertoire, the behavioral responses of "significant" others in their environment. The term "significant" refers to those in a person's environment who are able, to some extent, to control rewards and punishments for that person; 2) The greater the power another has over a person, the greater is the tendency for the latter to incorporate the responses of the other. Thus, not only do boys with sisters exhibit more feminine traits,but this tendency is greater for the second-born male. Presumably, this is due to the greater power that first-borns have over their younger sibs.

I am currently engaged in a study (Lavin, 1967b) which attempts to extend this line of inquiry to the assessment of intellectual aptitudes. In research on such aptitudes, sex differences repeatedly emerge. Evidence (Oetzel, 1966) shows that males outperform females on quantitative dimensions, while females are superior on verbal measures. This suggests that the development of intellectual abilities may be viewed, at least in part, as an aspect of sex role learning. Thus, it may be that the effects noted earlier for masculine and feminine behavior are also visible for aptitude levels. Consider the two-child family, and let us compare girls who have brothers with girls who have sisters. If the previous research can be generalized, we should expect that girls with brothers will perform better on a quantitative aptitude test than girls with sisters. In like manner, boys with sisters should perform better on a verbal measure than boys with brothers. In a pilot study on this topic, using a sample of undergraduates at the University of Pennsylvania, I have results which fit these expectations. These results also suggest hypotheses about achievement. We should expect that in mathematics courses girls with brothers should outperform girls with sisters. In like manner, males with sisters should outperform males with brothers in English courses.

In summary, the import of these findings is that while a significant portion of sex role learning is attributable to the relation of the child to his parents who, in effect, act as agents of more general societal norms concerning sex differences, siblings also exert effects which tend to reinforce or sometimes detract from sex role norms derived from the larger society. Furthermore, if the acquisition of aptitudes is an aspect of sex role learning, then the factors which determine their acquisition should also be related to school learning.

Aggregating the Relational Systems as Influences on Learning

Thus far I have discussed various relational systems and their effects on the student from the microscopic viewpoint. That is, I have considered how the student's relationship with teachers affects his achievement, how peer relations affect his achievement, and how aspects of his family life affect it. What has not yet been considered is how, in the aggregate, these various counter-positions influence the student. Such influences may be consistent with one another, in which case one may speak of an aggregate consensus of the counter-positions, or their influences may conflict. When the latter is true, the student is faced with problems of adaptation. He must somehow reconcile or allocate priorities to competing and conflicting expectations, and how he does this should have consequences for his learning. I now wish to consider the effects of consensus and conflict in this aggregate sense.

Consensus and Learning. In recent years considerable work has been devoted to the assessment of total school environments. Illustrative of these efforts are the studies of Pace and Stern (Pace, 1960; Stern, 1962). The approach assesses both personality and school environment characteristics. This has been done through an application of Henry Murray's (1957) conception of social psychology. Murray's view of the interaction between the person and the environment begins with the formulation of personality as a set of needs. The environment is viewed as consisting of a series of "presses". These concepts are coordinated with one another. For example, in the Pace and Stern research the personality measure contains a scale assessing the need for order, and the measure of environmental characteristics contains a parallel scale assessing the degree to which there are pressures upon students to be orderly. In other words, the term "press" refers to those aspects of the environment that tend to satisfy or deprive an individual characterized by a given need.

On the basis of this work it is possible to compare colleges and high schools on a standard set of dimensions descriptive of the school environment. In like manner the dominant personality characteristics of student bodies may be described. For example, student needs would include a description of the levels of intellectuality, dependency, and impulse expression, while school presses would contain descriptions of the environment on the same dimensions.

One can immediately see a number of problems to which this approach might be applied. Thus, within a school some students will experience a rather close fit between their needs and the school press, while for others there may be a lack of fit. The question of the degree of fit would seem relevant in relation to levels of achievement. In cases where few aspects of the overall school environment are satisfying to the needs of the student, this could lower his academic motivation, and thus his achievement. This question could also be looked at comparatively. Here schools might be classified according to whether they are "high fit" or "low fit", and this could be related to average achievement levels at different institutions.

Some work, particularly that conducted by Thistlethwaite (1959), indicates that the social climate of schools (in this case colleges) is related to types of Ph.D. productivity. That is, certain colleges seem to produce a disproportionately high number of graduates who go on for Ph.D.'s in natural science, while other colleges produce graduates who earn a disproportionately high number of Ph.D.'s in the arts, humanities, and social sciences. There are significant differences between these two kinds of colleges in the dimensions descriptive of their social climates.

While the work cited above suggests a very promising way of studying the effects of environments on learning, there is a tendency to represent the social climates in global terms rather than in terms of the various roles which comprise the social system of the school. For example, in measuring the degree of pressure on students to achieve at a high level, some items refer to expectations of the faculty, while others refer to student norms. However, if, at different schools, the achievement press is moderately high, this overall characterization could be arrived at in different ways. Both faculty and student expectations could be moderately high, students might be on the low side while faculty are quite high, - or faculty could be on the low side, while students are quite high. Thus, it is possible that the characterization of the total climate on this dimension might be similar at several schools, yet the distribution of expectations within the two role systems (teachers, students) might be quite different. Certainly it is reasonable to expect that the consequences of each of these distributions for student learning will be different. In short, characterizations of total school environments which ignore the variation around the central theme may sometimes conceal more than they reveal.

Conflict and Learning. The question of variation in a school environment leads us to the question of conflict. When a student's peer group has one definition of behavior for the student role, teachers have another, and parents still a third, what are the effects on the student? What determines the direction in which he resolves the inconsistencies? This is an extremely complicated question which has been little studied, and I shall do no more than try to identify some of the factors involved.

We can view the problem of conflict resolution between the focal position of a student and the various counterpositions in developmental terms. That is, we may say that the relative importance of teachers, parents, and peers changes as we move from the elementary school level, through the high school level, and into college. To my knowledge this question has not been studied explicitly, but I would expect that from elementary school through high school and college, the peer group becomes more influential, while parents and teachers lose influence.* Put simply, as students grow up, more and more of their satisfactions are derived from their peers, and simultaneously they become less dependent on parents. If there are developmental patterns in the rank order of importance of the different interpersonal networks, this provides a means of predicting how conflicts in definitions of the student role will be resolved.

While the probabilities may be that conflicts will be resolved in favor of peer groups at the high school and college levels, there are, of course, individuals who will arrive at different resolutions. In addition there may be schools where the peer group is not the most influential. What then, are the properties of the various positional networks, and what are the personality characteristics which lead to different resolutions?

One factor is the solidarity of the members of the various social positions. Consider the case of the medical student subculture as it is described by Hughes,

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*This expectation has been verified in a recent thesis by Alan Bell (Ed.).

Becker, and Geer (1962). Rather clear conflicts develop between medical school professors and the students over the definition of what is relevant for the training of the physician, and over what constitutes a reasonable student workload. The outcome is that the medical students are able successfully to resist the expectations of the professors. There are apparently several reasons for this. First, these students are a relatively small group which shares a common life situation to an unusual degree. They take the same courses, with the same professors, and they live and study together. This physical proximity both in and out of class provides a setting in which a common solution to their common adjustment problems can be worked out. The student may depend on the professor for grades, but he depends on his peers for help in studying, and for emotional support of various kinds. If he deviates from the peer group standards, he can be ostracized which means that he loses this important emotional and intellectual support. The costs of this outweigh the costs of not conforming to the letter of professorial expectations. Furthermore, what probably happens is that the professors, at least privately, come to accept student definitions. In effect the student system is able to modify the teacher system to some degree. In this case the student system is more solidary and controls more rewards and punishments for the individual student than does the teacher system. The students are there for one reason - to become physicians. The teachers, on the other hand, have many professional activities: they teach, do research, attend conferences, and often have private patients. Their own involvement in all of these systems creates great demands on their time and undoubtedly makes the frequency of their interaction with one another less than that of students with one another. This, plus the fact that their interests are dispersed and that some may have priority over teaching, means that they are less solidary in relation to students than students are to them. I believe this situation occurs in college and perhaps in high school also. If one has a poorly motivated class which is not doing as much work as it should, the professor can give more quizzes, can make exams harder and so forth. If he does this, he will spend more time grading papers, and more time seeing students who complain or plead about their grades. More time spent on these endeavors means less time spent in other pursuits. Thus, the system generates pressures on the teacher to adjust his expectations.

Out of the preceding discussion emerge a few generalizations which, hopefully, are testable. First, the more solidary the peer group, the more it controls rewards and punishments, and thus, the more likely it is to influence any individual student to conform to its definitions. Conversely, the less solidary the peer group - that is, the greater the number of cliques which hold different definitions, the less likely is it that any one group can influence students who do not want to be influenced. Furthermore, under these conditions "anti-faculty" peer groups may have to accommodate more to faculty expectations, since they are less able to present a common front.

Looked at from the teachers' point of view, the extent of peer group influence will vary inversely with the degree of faculty solidarity. Thus, at small liberal arts colleges where teaching is the primary interest, teachers should be more successful in imposing their definitions of student performance, than at the large school where many interests compete for their attention. In short, holding peer solidarity constant, the greater the solidarity of faculty, the greater their influence on the student. Conversely, holding faculty solidarity constant, the greater the solidarity of the peer group, the greater will be its influence on the student.

These general effects are mediated by personality factors. Thus, if a student has a very strong commitment to faculty ideals, and is also an independent person, he may be able to endure the pressures of a solidary peer group. Of course, if the peer group is not solidary, the costs to the student will be less.

Illustrating the question of commitment to different categories of positions is Newcomb's well known study of Bennington College (1943). He observed a conflict situation in which many girls found themselves. The essential problem was that the political atmosphere at Bennington was one of radicalism, and there were normative demands placed on the students both by their peers and, at least tacitly, in the faculty to present a liberal or radical political outlook. However, the majority of the girls came from well-to-do families in which the political orientation of the parents was typically conservative. Many of the girls seemed to have no difficulty resolving this problem. They simply adopted the values of the college community. Other girls, however, experienced the situation as a very conflictful one. Which way it was resolved was largely determined by the extent of dependency on their parents and by their needs for acceptance and approval from their peers and teachers. The degree of dependency and commitment to the family was thus a factor which helped to explain the direction of the resolution. However, whatever the resolution, costs were involved. If a girl moved toward peer values, the cost was likely to be family disapproval (if the family felt strongly about it). If she maintained family political values, the cost was lack of popularity with peers, and perhaps less approval from teachers.

Generalizing from the Bennington study and assuming a system consisting of just three positions (students, teachers, and parents), I would hypothesize that when two positions share an expectation for the student, while one holds a conflicting expectation, other things being equal, the student will be influenced in the direction of the majority expectation. Looking at it from the personality viewpoint, I would hypothesize that when the positions hold conflicting expectations, the direction of resolution will be determined by the relative strength of the student's commitment to each position.

Effects of Relationships in which the Student is not Involved. The analysis has, up to this point, focussed upon the question of aggregate consensus or conflict in terms of the relation of the student to various counter-positions. There is another type of question which has not yet been discussed. This involves the effects upon the student of role systems in which he does not participate. Consider the teacher-teacher relationship at the college level. In many cases the professorial system defines research and writing activities as having higher priority than teaching duties. Where the admiration and rewards from one's colleagues are derived primarily from the former, then committment to - and enthusiasm for teaching is likely to be diminished. In this way the manner in which the teacher relates to his students is determined by his interactions with professorial colleagues. Thus properties of faculty interaction may enhance or impede student learning.

Another example would be the situation in which an administrative decision is made to allocate greater resources to the development of natural sciences at the expense of the humanities. This might involve allocations for facilities as well as differentials in faculty salaries. Quite possibly, the consequences of such decisions for the morale of segments of the faculty and on phenomena such as faculty turnover may affect the learning situation in which the student finds himself. This in turn may affect his achievement, his intellectual commitment, and the like.

Summary

The preceding discussion has identified a number of organizational characteristics which need to be considered in developing a comprehensive model of the effects of interpersonal forces on student achievement. Such forces occur on a number of levels. First, we have viewed the student in relation to significant counter-positions, and have asked how the properties of each of these relations considered separately may affect learning. Second, we have considered the simultaneous relation of the focal position to the counter-positions. Relevant here is the question of the degree of aggregate consensus or conflict. How conflict is resolved and its implications for learning has also been examined. A third point is that relational systems in which the student is not involved may nevertheless reverberate so as to affect him. Illustrative here is the teacher-teacher relationship and the teacher-administrative relationship.

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X

OVERT VS. LATENT TEACHER ATTITUDES

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I take my problem to be, how can the attributes of classroom teachers make a difference in the amount and kind of academic learning that occurs among students? The problem is on a macroscopic rather than microscopic level. That is, the variance in academic learning for which teacher variables must account consists of reasonably stable differences among students across classrooms, regions, and nations and not momentary or idiosyncratic differences.

I construe the term attitude in the title of the paper to describe relatively enduring styles of behavior as well as the underlying organization of cognitive, motivational, and affective processes that provide the behavioral style with a semblance of unity. The term is not used, therefore, in the more restricted sense of technical social psychology, which excludes overt behavior from its meaning. Further, when I speak of the teacher attributes of behavior, attitudes, and the like in this paper, I do not want to be misunderstood as to where I believe their sources lie. It is conventional in some intellectual circles to view the teacher's classroom behavior as governed by personality characteristics and value orientations that are shaped by the teacher's location in the social structure of the community or society and imported without alteration into the classroom. In short, the teacher's character is molded by his societal positions and now inexorably programs his behavior as he instructs students. But a teacher's behavior may also be governed, sometimes more powerfully, by normative expectations of members of his role set and by the requirements of the technical system of work in the school. I will not address myself to the determinants of teacher attributes in this paper, but I do not want to leave the impression that I regard them as immutably given in the person who walks in the schoolhouse door in the morning. They are also affected by what he encounters once he gets inside the building.

Half-a-century of educational research on the teacher variable hardly invites optimism with respect to the problem before me. Not long ago I reviewed hundreds of studies that dealt with the social background of teachers and its consequences for the conduct of classroom instruction (Charters, 1963). Much of the research was purely descriptive, and not many investigators sought to relate variations in teachers' social characteristics directly to classroom variables, but the conclusion was clear. There is no social attribute of teachers that is known through repeated investigation to make a difference in the way classroom instruction proceeds, let alone in how much students learn from instruction.

Those studies approached the problem from its distal end, while the huge literature on teaching effectiveness approaches it from the proxmal end (Barr, 1948; Domas and Tiedeman, 1950; Morsh and Wilder, 1954). What is there about teachers and teaching procedures, the studies ask, that creates known (or presumed) differences in student learning? Investigations of teaching effectiveness have suffered from severe limitations over the years, but nevertheless there is precious little that can be said from the research about how a teacher is to perform in the classroom that unequivocally will affect the level of academic achievement. Many scholars now believe it is fruitless to search for single attributes of teachers that predict achievement across all classrooms for all students. They are inclined to the view that achievement is the product of complex interactions between teachers and procedures, on the one hand, and attributes of students, on the other.

So from a historical perspective, at least, the prospects are not bright for turning up attitudes of teachers, overt or latent, that in themselves can account for substantial variance in amounts and kinds of academic learning. It will be necessary, I believe, to lock the teacher variable systematically into variables associated with the classroom interaction process, the student culture of the school, and features of student cognitions and motivations before progress can be made. To accomplish such integration is a far more ambitious problem than confronts me now, but the observations in this paper may provide a point of departure.

Despite the historical pessimism, the feeling persists that the teacher does make a difference, and a profound one, in student achievement. Consider for a moment how a teacher could, if he wished, prevent classroom learning from occurring -- by garbling thoroughly his presentation of material to be learned, by assuring the constant presence of powerful distractors in the learning situation, or by so challenging the egos of students that either they must spend all of their psychic energy on ego-defensive maneuvers or withdraw physically or psychologically from the learning situation altogether. If a teacher can do this wittingly, so it can happen unwittingly. And if a teacher can prevent learning, he may also be able to enhance it. It is in this more optimistic vein that I will get on with the problem.

Nature of the Instructional Process

Instruction occurs in many ways, including self-instruction and nowadays instruction by machine, and in many places, including the bosom of the family. My concern, however, is with formal instruction that occurs in the usual school setting. It is a kind of instruction that proceeds through a system of social relationships implicating both the role of teacher and the role of student and in a small social system dedicated narrowly and specifically to the task of student learning.

The process of instruction is one in which a student is exposed over a period of time to a succession of events arranged for him by the teacher and designed to have a cumulative and lasting effect upon his cognitive capacities and behavioral propensities. The teacher, in effect, manages the exposure of students to these "instructional events" which presumably help to shape the students in accordance with an envisioned outcome -- the educational goals of course and the school.

The student, being a selective and reactive human organism, is free to ignore or embrace what the teacher sets before him. He is capable of actively resisting the teacher's efforts to instruct him, but at the same time he is capable of exposing himself to instructional events on directions from the teacher and to learn from them without the direct presence of the teacher. Indeed, most academic learning may take place under the latter circumstance -- as the student works quietly at his desk or studies at home.

The Teacher's Task

There are two fundamental aspects of the teacher's task in the instructional process. First, the teacher must make the instructional events available to students. He must provide visual and auditory stimuli in the form of written and spoken words, mechanical displays, and social circumstances, along with cues or more explicit directions as to what features of the stimuli to attend and what to ignore. The teacher may or may not emit these stimuli himself, a matter we will take up in a moment, but he must somehow provide them and arrange them in an order and at a level he judges to be appropriate in producing the kinds of change he seeks in students.

Second, the teacher must induce students to engage the instructional events he provides. He must certify that the students see, read, listen, reflect, rehearse, and otherwise come to terms personally with the events at a level sufficiently deep within themselves to impress and, hopefully, change cognitions and behavioral inclinations. This, of course, is the central problem of learning, and psychologists differ markedly in their views of how it comes to pass. In any case, it is to the teacher's great advantage if students bring to the classroom built-in proclivities to engage the instructional events furnished them, and it would seem that a good bit of time and ingenuity is devoted in the school system to the cultivation of just such proclivities.

This analysis of the instructional process is far too gross to shed much light on the significant issues in teaching, but it does enable me to set boundaries on the problem at hand. It suggests conditions under which we would _not_ expect the attitudes and behavioral styles of teachers to have an impact on the achievement levels of their students.

Boundary Conditions of the Teacher's Influence on Achievement Level

There appear to be two conditions under which attributes of the classroom teacher would have little or no bearing on the amount and kind of academic learning observed among students. They can be elucidated with regard to two orthogonal parameters in the learning situation: the extent of _pre-programming_ of instructional events and the level of student _motivation_ to engage in the events. They vary independently of one another but operate jointly to determine the teacher's potentiality for affecting achievement.

Pre-programming

Instructional events often are readily available to students in well-ordered forms at levels suited to their sophistication without the intercession of a teacher. A good textbook is a case in point. The extreme instance of independence is the fully automated instructional system, but excluding this, classrooms nonetheless vary the full range of a continuum from high student dependency on the teacher to provide and arrange the instructional events necessary for subject mastery to almost total independence from the teacher for content. Some of us are acquainted with lecture courses, especially in higher education, in which the achievement test is narrowly tailored to the material presented by the teacher, and no amount of outside reading can substitute for faithful lecture attendance to prepare one for the examination. This is the limiting case of high dependence (or low pre-programming). But another familiar sight is the public-school classroom in which the teacher does little more in the way of instruction than set the pace at which students move through the textbook. Such teachers play an extremely minor role in ordering the sequence and content of the instructional events, and they may need to intervene only infrequently to direct student use of the book or to amplify the material in ways suited to individual learning difficulties. When the teacher does intervene, the increment in academic achievement may be slight compared to the level obtained through the program itself. My first proposition is that the greater the pre-programming of instructional events associated with a subject area, the less relevant the teacher's attitudes and style of behavior will be in affecting the level of academic achievement among students.

Motivation

Students indubitably vary in their strength of motivation to engage in the instructional events available to them. Such motivation can arise from a number of sources -- from satisfactions intrinsic to the learning process itself, from instrumental connections seen to exist between learning and extrinsic goals, like high grades, parental approval, or occupational success, or from student's interest in avoiding distasteful situations, like being unable to answer questions asked by the teacher. Some sources of student motivation depend immediately and directly upon the teacher for their initiation and consummation, while other sources are not at all contingent upon the teacher, at least not at a given point in time. It may be, for example, that a student has come to value grades so highly that his teacher need not concern himself with the task of inducing exposure to instructional events. Students who are terribly compelled to learn will do so in spite of the teacher. The second proposition hold, then, that the higher the students' internally-impelled motivation to engage in instructional events, the less influence the teacher's attitudes and behavioral style will have on academic achievement.

The two parameters operate together to tell us when we may expect the teacher variable to make a difference in academic achievement and when it would not be expected to contribute. When pre-programming and motivation are both high we should be able to discount effects potentially due to attributes of the classroom teacher, and when they are both low the characteristics of the teacher should enter the picture in full force.

Teacher Attitudes and Behavioral Styles

Assuming a population of classroom where student motivation and instructional pre-programming are not so high as to preclude operation of the teacher variable, what things about the teacher and his manner of conducting the class should make a difference in the amount of student learning that goes on?

In proposing some answers, I have drawn most heavily on the writings of N.L. Gage, who has recently culled the literature on teaching and learning for whatever lessons it holds concerning attributes of teachers that make for effectiveness (Gage, 1966). He found five attributes with enough research support or logical validity to warrant serious attention: warmth, cognitive organization, orderliness, indirectness of instruction, and ability to solve instructional problems.

Where Gage (and those whose work he cites) focused on the more personal attributes of teachers, F.G. Cornell and his associates a number of years ago dealt with types of instructional pattern found in American classrooms in their effort to construct a measuring instrument for discriminating broadly among instructional settings (Cornell, Lindvall and Saupe, 1952). Despite the paucity of subsequent research with their measure, their level of analysis seems especially appropriate for the problem of this conference. Their four most relevant (and also most dependable) descriptive categories are differentiation, the extent to which instruction is individualized, social organization, the type of group structure and the pattern of group interaction in the classroom, initiative, the extent to which students control the learning situation, and content, the organization of instruction around subject matter as opposed to problem areas.

The most extensive effort to delineate styles of classroom behavior among teachers is the research of David G. Ryans and his co-workers who found several pervasive dimensions along which behavior varied (Ryans, 1960). They selected three as worthy of consideration: Pattern X_o, which reflects teacher understanding and friendliness vs. aloofness and egocentrism, Pattern Y_o, reflecting responsible and businesslike vs. unplanned and slipshod behaviors, and Pattern Z_o, reflecting imaginative and stimulating vs. dull, routine behaviors.

I should mention, too, the studies in which Leslie Wehling and I sought to tease out the principal dimensions according to which teachers cognize the classroom teaching-learning process (Wehling, 1964). The four most insistent dimensions from our several factor analyses of teacher questionnaire responses were teacher control vs. student autonomy (a bi-polar factor), subject-matter orientation, consideration of student feelings, and belief in emotional disengagement. Each represents a dimension underlying teachers' views of how instruction must proceed if it is to make a difference in student learning.

There are a number of other interesting observational studies of interactions, relationships, and teaching strategies in the classroom, but the approaches mentioned above are the ones that have most contributed to my thinking about the problem at hand. In presenting my observations, I will begin with some teacher attitudes and instructional styles suggested by a rather rational view of the educative process, relating to the teacher's functions in the communication of meaning to students. Some other attributes of teaching style, not altogether independent of the first, are suggested by the view that classroom instruction reflects the implicit educational theories of the teachers who direct it. Finally, I will consider some teacher attributes proposed by the view that instruction is at its roots a social relationship between two categories of human beings. There is a vague correspondence in the order of presentation with the distinction made earlier between the teacher's task of providing students with instructional events and the task of inducing students to engage in the events, but the correspondence is not clean. The same teacher behaviors may simultaneously contribute to the solution of both problems.

Teaching as a Communication Process

One active line of contemporary investigation is examining the instructional process as an elaborate system of information exchange -- a communication process in which the student, through the agencies of the teacher, comes to acquire meanings that reside in the subject material. I do not intend to trace out the complex models that have been developed in this area, since they tend to be too microscopic for our purposes, but rather to use the perspective of the approach to suggest four attributes of teachers that should bear on student achievement.

1. Knowledge of the subject. The requirement that the teacher "know his subject" is so widely acknowledged that extended commentary on the point is hardly warranted, but one comment is necessary. The teacher's knowledge of the subject matter he teaches must be considerably more sophisticated than what is implied by the teacher's ability to keep a chapter or two ahead of his students. As Gage and others have pointed out (Gage, 1966), the teacher's appreciation of the subject must be at a much higher level of abstraction than the level at which it is taught and must include an understanding of how the ideas and information

hang together to comprise a formal structure of knowledge. The teacher's knowledge of his subject is rarely assessed by researchers in these terms.

2. Pedagogical communication. The teacher's knowledge is useless, of course, until it is coupled with a capacity to communicate meanings skillfully. The art of teaching is sometimes said to lie in the teacher's ability to present ideas (or amplify ideas in instructional materials) in such a way as to excite attention and at the same time to lead the mind inescapably to conclusions that furnish profound, stable conceptions of system and order. Components of the teaching act that make for the effective communication of ideas are by no means clear, but some guesses can be made. The work of B.O. Smith (undated), for example, points to the significance of the teacher's knowledge of, and capacity to employ, the logical operations of definition, description, classification, explanation, and the like, and his ability to diagnose the logical failures in the reasoning of students. Another aspect could be the teacher's appreciation of, and willingness to adapt communication to, the prevailing interests and experiential frames of reference among the students. Those who can "take students from where they are" should have fewer communication difficulties than persons who have no idea how the students approach the world in which they live. (See No. 4, infra, on cognitive matching.)

3. Teacher-student interaction. In theory it would seem that effective pedagogical communication requires substantial teacher-student interaction in the classroom, a matter which investigators occasionally have sought to measure, but a special kind of interaction in which the teacher a) receives continuous informational feedback from students and b) uses the feedback to alter his instructional strategies as the occasion warrants. Jones and Thibaut (1958) refer to this as reciprocally contingent interaction (as opposed to asymmetrically contingent interaction and noncontingent interaction). The trouble with the theory is that

it does not account for obvious differences in "feel of the audience" among teachers (as well as other performers) in situations where cues from the audience are minimal or altogether wanting.

Feedback from students, however, is spread over long as well as short periods of time, and the alterations the teacher makes in instructional strategies may be more evident from one school term to the next than from one interaction episode to the next. Through extended experience, the teacher may adapt instructional events to the interests, capacities, and learning problems of categories of students, and so long as the students remain reasonably constant, continuous interaction in a particular classroom is not essential. Short-run interaction analysis would never reveal this long-run form of reciprocal contingency. A more appropriate way to measure it would be to assess the teacher's phenomenal conception of the "the student". I will come back to this in a moment.

First, I should note that teacher-pupil interaction, whether reciprocally contingent or otherwise, apparently serves other purposes in the classroom than simply maximizing the exchange of information. The commonly observed question-and-answer pattern of instruction often is used as a device to induce student engagement with assigned lessons. No one knows for certain how successful this induction is, but there is little question about its universality. There are still other pedagogical reasons for teacher-student and student-student interaction, and it may not be amiss to apply the available measures for estimating the frequency, direction, and spread of classroom interaction on the possibility that they would help to account for achievement differences.

4. Cognitive matching. The adequacy with which "the student", as a category, is represented in the cognitions of teachers would seem to be an important ingredient in the effective communication of ideas. In other words, how full and veridical is the teacher's stereotype of students? I use the term in a

non-pejorative sense. Some investigators have had success in using the Semantic Differential to assess cognitive representations, and the so-called Kelly Rep Test can be easily adapted to the purpose (Osgood, et al., 1957; Kelly, 1955). In any event, adequacy of teacher conceptions of students can be evaluated in terms of their degree of articulation, differentiation, flexibility, and freedom from closure.

Adequacy can also be assessed in terms of the degree of match between the stereotype and the reality, although the procedure harbors some tricky measurement problems. An extension of the idea of cognitive matching is found in current investigation into linguistic similarities -- the students' capacity to understand the teacher's language and vice versa (Peisach, 1965).

Teaching as Manifest Educational Theories

Conventional wisdom abounds concerning the patterns of instruction that lead most directly to student learning. There is no reason to assume that teachers do not govern their conduct of the classroom in conformity with the particular educational theories they have accepted as their own. (It is a matter if indifference, for our present purposes, if the teachers' theories are simply rationalizations of particular patterns of instruction to which they are somehow committed.)

If teachers are asked to describe their conceptions of teaching, two measurement problems arise. The first is that of defining dimensions or types of "educational theories" that are congruent with implicit as well as explicit conceptions held by teachers. Usually, measurement efforts have reflected the typologies and logical classification systems of professors and other pedagogical theorists. The second problem lies in certifying that teacher conceptions of how they should think about classroom instruction do not color their reports of how they do think. The two problems are connected. While I will not direct myself to either measurement issue here, I think both can be solved without undue difficulty. I will use the perspective, rather, to suggest a few potentially fruitful ways of differentiating among instructional styles.

5. Subject matter as the organizing principle for instruction. Pedagogical theorists often contrast two alternative bases for organizing instructional events: according to the logic of the subject matter or according to the psychological interests and needs of students. A "subject-matter-centered curriculum" is regarded as the polar opposite of a "problem-centered" or "inquiry-centered curriculum"; "traditional method" is the opposite of "project method". Curiously, there is persistent evidence that classroom teachers, American, that is, do not share the conceptual schemata of professors. Teachers do not see the pairs as opposite types. In factor analytic terms, the relevant factors are not bi-polar (Kerlinger, in press).

There *is* consistency, however, in the extent to which teachers regard subject matter as the prime basis for organizing instructional events, and the stand a teacher takes on this issue is a highly central component in his implicit theory of education. If he emphasizes the subject-matter principle strongly, many other aspects of his belief system follow suit. The main question that can be asked about the instructional style of teachers, then, is the degree to which teachers depart from or conform to a textbook-dominated, subject-centered classroom in which student acquisition of facts and information is the uppermost instructional objective. This question should be asked without raising the complicating one of what alternative form of organization the teachers are trying to approach.

6. Teacher-centered vs. student-centered classrooms. Another pair of polar opposites employed by educators is "teacher-centered" vs. "student-centered" classrooms. In this case, however, the terms correspond to teacher conceptions

of the educative process. Several investigations indicate that teachers cognize the learning situation from the standpoint of the extent to which they, the teachers, must closely control events in the classroom, instructional or otherwise, as opposed to the extent to which students must be given freedom to chart their own courses of learning. Evidence suggests that there is a slight correlation between the teacher's orientation to a subject-matter-centered curriculum and a teacher-centered classroom, but the two dimensions are substantially independent.

This is an especially interesting component of teachers' views on education in that it corresponds to a more general orientation, extending well beyond the classroom setting. At least, it has been identified as an important dimension in such interpersonal contexts as parent-child relationships, leadership behavior, and by Leary (1957) in a wide gamut of more casual circumstances. Whether or not it connects with student achievement is another question. In fact, if we accept the conclusions of Anderson (1959), after his review of research on the outcomes of learner-centered and teacher-centered instructional methods, the answer would be that the variable is inconsequential.

7. Attributions of casuality in student learning. A heretofore unexplored aspect of the implicit educational theories of teachers also touches on more general, extra-classroom attitudes. It has to do with the teacher's conception of the causal forces underlying student behavior and misbehavior, the determinants of student success or failure in learning. First, in what degree is the teacher causally oriented at all? It is not beyond credibility that some teachers approach their work in a strictly ritualistic manner, with no inclination to apply a means-ends schema to their performance. Second, assuming some attribution of causality, does the teacher see the determinants of learning difficulties as lying partly, at least, within his realm of control, or does he

see the cause or causes of student performance embedded in the genes or in the parent-child relationship or some other location beyond his capacity to alter? Are attributed causes simplistic or complex, stereotyped or dependent upon the case? Answers to these questions should determine how actively the teacher will intervene in the learning process and the kinds of solutions he is likely to employ in the event that he does intervene.

Answers to the questions should also reveal the extent of the teacher's own sense of powerlessness with respect to the task for which he is held responsible. Feelings of powerlessness, as we know, can be highly pervasive attitudes coloring much of a person's demeanor. Some investigators have proposed that they are antithetical to the achievement motive. If true, and if the teacher's sense of resignation should rub off on his students, the import could be great for the level of academic learning.

Teaching as a Social Relationship

Instruction of the sort we have been discussing is carried out in the context of a social relationship where warm-blooded human beings interact with other human beings. The entire spectrum of forms of human relationship has an opportunity to enter the classroom setting -- from status differentials and manifestations of power to the gratification of basic and maybe bizarre urges within the personalities of teachers and students. Some forms of relationship may act as distractors in the instructional process, subverting attention from the task of learning to the protection of self-identity; others may serve to enhance learning, either in the short run or the long run. Still others may be quite irrelevant to student achievement. I can select only a few of the more salient forms on which to comment.

8. Affect toward students. Teacher attitudes of warmth, liking, and acceptance toward students is one of the most frequently researched of all the

attributes of teachers. Gage (1966) has made a case for the instructional significance of teacher warmth from the standpoints of both the conditioning theory and the identification, or modeling, theory of learning.

Precisely when and how expressions of warmth act to affect academic achievement or how the converse of warmth (hostility, rejection) operates to inhibit learning is not understood. For one thing, it is a variable whose consequences are known to be conditional on the nature of student expectations of and preferences for teachers, and it interacts with the maturational level of students. It is possible, too, that the teacher's absolute level of warmth is a less significant factor than his failure to distribute it evenly to all students, running counter, as this failure would, to the powerful classroom norm of "fairness". Moreover, teacher expression of warmth is often a qualified expression -- qualified by a degree of social distance that teachers may try to maintain between themselves and their students. When warmth is severely qualified by aloofness, it may produce respect rather than liking for the teacher, a distinction that is held to have differential consequences in interpersonal relations (Newcomb, 1959; Smith and Lutz, 1964). In short, teacher affectivity toward students is a complex variable in its contributions to learning, but it is one well worth taking into account.

9. Discriminatory use of reward and punishment. While the teacher tends toward universalism in relating to students within the classroom social system, the teacher is also a participant in the larger society, and it is not entirely surprising to find some teachers who relate to students differentially in terms of their ascribed statuses rather than strictly in accordance with demands of the learning task. Thus, teachers may use their power in distributing rewards and punishments to define and conserve status differentials among students and even between the student and the teacher. Observation of teacher-student interaction,

for example, has disclosed instances of sex discriminations in teacher behavior that serve to reinforce cultural role definitions for boys and girls, and similar discriminatory behaviors surely occur with respect to race and social class in some instructional settings. Conceivably, discriminatory behavior is unwittingly used by teachers to establish, say, the sex typing of subject-matter areas and occupational pursuits -- to establish the propriety of girls, for example, taking advanced work in mathematics and (worse) excelling in it.

I have alluded to one consequence of discrimination on student learning: its reinforcement of prevailing societal norms. Its impact on the level of academic achievement undoubtedly works by inhibiting engagement of instructional events among students against whom the discrimination is directed and, at the extreme, to disengage such students from further schooling altogether.

10. Teacher-student disjunctions in social class. Disparity in the social class standings of teachers and their students is frequently advanced as a significant issue in the educative process, but its consequences for student achievement are not self-evident, other than those that occur through the mechanisms I have already discussed. Disjunctions in social class may pose difficulties in cognitive matching and distort teachers' attributions of causality; above all, they may lead to discriminatory distribution of reward and punishment. Rather than elaborate further, I will confine my remarks to a methodological matter.

Researchers regularly encounter a problem in establishing the attained social-class position of teachers when conventional measures are employed. These measures typically depend upon such variables as occupation, income, or educational attainment to define social-class levels, and when they do, the standing of teachers is almost automatically determined. Educational attainment and income are closely restricted among teachers and occupation is a constant. Hence, it is virtually impossible to discern important social class variations among teachers without resorting to a measure of their social-class origins.

A fruitful solution of the problem can be found in the Social Class Identification scale devised by Sims (1952). It measures subjective placement in the status hierarchy. The respondent is asked to rate some 40 occupations as to their social standing vis-a-vis the respondent's own, or his family's, standing, and since the ratings of the occupations already are known from research on occupational prestige, responses can be converted to reveal the prestige level at which the respondent perceives himself. While it is purported to be an indirect measure whose purpose is opaque to respondents, my own experience with it does not support the contention. Nevertheless, in several studies where I have used it, I have been surprised by its highly sensitive construct validity. The availability of research on occupational prestige in a number of nations, which, incidentally, indicate close similarities in occupational ranks, gives the Sims measure the advantage of being readily adapted to inter-nation comparisons.

Signifying Attributes of Teachers

There is an interesting class of teacher attributes that depend for their effects not on how the teacher behaves or conducts the instructional process but simply on who the person is that inhabits the teacher position in the classroom. One can imagine the difference it would make to students to know that high school English teachers, as a rule, were top-flight novelists and literary critics with regional or national reputations rather than, as a rule, marriage-oriented college girls who happened to take a major in English. These attributes signify the meaning of education to students. Their impact on academic achievement comes through the implications they hold for the general orientations of students toward schools and schooling, a matter well beyond the scope of the present paper. For this reason I shall not expand on the theme.

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The preceding observation leads me to a concluding remark. The teacher's contributions to academic achievement, I believe, are more intimately related to the whole institutional fabric of the school than my presentation would indicate. The teacher variable should not be treated as an isolated phenomenon but systematically connected with other determinants of academic achievement. This paper is one attempt to help in founding such connections.

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XI

THE REWARD SYSTEMS OF THE SCHOOL

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In approaching the task assigned me, I have had considerable difficulty in finding a way to approach the problem, because I am handicapped by a lack of adequate information about the educational systems of other countries, about their economies, and specifically, about their reward systems. Therefore I shall have to resort to the model about which I feel relatively informed, which is the U.S. educational system, public and private, hoping that this may have some application.

First let me refer briefly to the data which inspired these flights into theory, those of the IEA Mathematics Study. The first problem which occurs to me is whether or not the samples are indeed representative. There seems to be a lack of certain occupational groups in some samples which could be the source of the differences reported. Before leaping off into notions as to why some educational systems seem to work better than others (i.e., the Japanese score better on certain mathematical tests than other countries), it might be well to recognize that it is possible there are no true differences between countries. If true, this would suggest that national educational systems such as these do not vary in productivity. I would suspect that this may be true.

The alternative is to regard the data as representative, at least for the sake of theorizing, which leads us to wonder: Why do certain educational systems apparently produce higher scores on certain measures than others? One immediate answer is to invoke the unpopular theory of national differences. It seems plausible that different cultures and nationalities contain different patterns of abilities for a variety of reasons, some innate, some environmental. If so, differences in educational outcomes are likely, regardless of the educational system itself.

The third approach is to accept these data and to assume that the differences shown here are true and due to the differences in educational systems, by which is meant a model of input-process-output-utilization. It is in this context that I would like to discuss the reward system, by which I mean something given in return for some piece of behavior. (It is not necessary to assume that the behavior is "good" in the eyes of both the giver and receiver: To be sent from the room by an irate teacher and told to report to the principal may be "good", i.e., a victory of strength to the pupil, although the teacher sees it as punishment for bad behavior.)

There are at least three parties to this reward system in education: the school staff, or educational establishment; the community, including the parents; and the pupils. These three groups, and their sub-groups, have very different views of the reward system at times, largely because they have different goals in mind. Let me start by discussing these goals and relating these to rewards.

Goals of the Educational Establishment

These have been discussed often by others more competent than I, but let me set out one possible array for this discussion:

1. Transmission of skills and knowledge
2. Preparation for social roles in a particular society
3. Transmission of cultural and national heritage
4. Preparation of manpower for the economy
5. Classification of the potential manpower for selected roles
6. Transmission of appropriate school behavior
7. Training for discovery of new knowledge.

The first four of these are well understood and often cited. The fifth is relatively new to the scene but increasingly important. As we approach a meritocracy, the role of the school as judge of who shall go to what next level is causing some anti-school sentiment, as demonstrated by the resentment of both parents and students in the classification system for entrance into the multi-levelled University of California (Kerr, 1967). This role of the school has become increasingly needed as the system itself has grown, and differential tracks for different educational processes became either needed, or in vogue. Even if homogeneous grouping were abandoned everywhere at the elementary level, there could be no escaping the fact that not everyone can nor should attend Harvard or Berkeley, so that some selection must take place. The elementary and secondary schools play a critical role as the classification agent. In many schools, classification begins at entrance to kindergarten where the young child is now "screened" for potential school difficulties, and perhaps given a selective curriculum, grouped, or put into unit 2 rather than 4 of the non-graded school. School staffs apparently have assumed this classification role as necessary, as theirs, and as theirs alone. They resent the intrusion of any outside group, such as parents or pupils, assuming for themselves a legitimate role in this classification process. Grouping is not done solely on the basis of test scores (which could be a rational method) but often by some undisclosed divine wisdom. As a classifier of the talented, the stupid, the emotionally disturbed, the underachiever, the overachiever, the school has moved into a role which involves the dispensing of important rewards. This judgment is challenged by those parents and pupils who do not receive the particular reward they seek in the options next available in the system.

As both Goslin (1965) and Kerr (1967) have pointed out, the educational system will play an increasing role as a classifier, and will provoke more and more antagonism over time. This may become particularly acute in the U.S. because such classification conflicts with our notion that the public school is to be the door to an open society for all. Certain educational doors will close early, as more specialization occurs, and as the ratio of those who desire the reward of the next educational step (college, graduate school) increases in comparison to the available places.

The sixth goal, transmission of appropriate school behavior, seems less rarely mentioned, except to speak of the conflict between middle class values of teachers versus disadvantaged pupils. This may be a somewhat erroneous view of the problem. Many teachers are not middle class, but they adopt a code of behavior which they believe is appropriate to the system and, in turn, expect pupils to adopt that same behavior. We need not labor the point here about the expectancies of teachers or their stereotypes of little children. What is emphasized here is that there is a code of behavior which is accepted in a school, just because it is a school, which the school staff hopes to inculcate into its pupils. The school staff sees that goal as good, civilizing, pleasant, respectful, etc. One could speculate that the behavior of teachers and pupils in school is more nearly alike, from country to country, than any other piece of behavior within each country. It is an international culture, much like international behavior in religious places, and perhaps for similar reasons. The school sees itself with an awesome responsibility, as indeed it has, to transmit the knowledge, the culture, and the expected social role for its particular society. It has reverence for these things which it is to pass on, and it expects a reverential attitude and behavior from the recipients.

But there is conflict about this goal on the part of the community, and especially on the part of the pupils. Many pupils see no rationale for this goal, and interpret the school's expectations as merely an authority conflict. They are partly right, of course, for the expected behavior rests on the assumption that the school staff does have authority, and that this authority should be respected. Adolescent subcultures often challenge both of these premises, and sometimes quite successfully. Parents and teachers tend to be near in age, and often share the belief that children should behave a certain way at school, and may join in condemning the latest teenage fad. It is interesting how often the school chooses to make an issue of appearance, such as style of dress. We need to understand that the appearance of rebellion is a very dangerous thing if the group in power, the school staff, is sitting on the verge of mutiny everyday in school. As Waller (1932) pointed out years ago "the school is a despotism in a state of perilous equilibrium". Just as the captain of a ship would not tolerate disheveled dress among his crew because it symbolizes a flaunting of authority, so are schools sensitive to any obvious behavior which symbolizes defiance.

The last goal, training for discovery of new knowledge, is a curious goal in that one almost never hears a public school administrator mention it, but many people outside the school mention it frequently. At this historical moment, scholarship and intellectual curiosity are much in vogue again, and curricula are being constantly rewritten toward this end by scholars outside the system. But apart from this contemporary phenomenon, it is my impression that public school staffs rarely mention that the goal of education is, or should be, to produce educated people who can create new knowledge or techniques which would eventually be incorporated into what the school transmits. One might even argue that the true reward of education is the pleasure of learning. But as a goal, as perceived by the school staff, it belongs low in the range of visibility. This also produces conflicts over goals and rewards. The student may state he wants to learn-just-to-learn and doesn't want to cram for tests to get into college. It is likely that his teacher will argue in favor of pragmatism, which is to get classified into the next step, and against the love of learning, the implication being that such a luxury can come later (one wonders when). However, were a school to take seriously that its major devotion should be to the scholarly way of life, it would be attacked from most quarters of the community immediately, because it would not appear to be fulfilling the other six goals mentioned earlier.

For the school then there are conflicts within goals for the staff itself which make for some inequities in the reward system as dispensed by the school.

Goals as Seen by Parents

Transmission of Skills and Knowledge

On this point there is harmony between the school and the parents -- provided we can get agreement on what skills and what knowledge. Everyone wants the schools to teach, and to give quality education, whatever that is. This has been a continuing debate for the last one hundred years in this country, involving such issues as classical languages, new math, vocational training, driver education, etc. This debate is necessary and probably worthwhile because society itself must finally determine what it wants its schools to teach, if they are public schools. This is to say that the curriculum is finally shaped in the marketplace of community opinion.

Preparation for Social Roles in a Particular Society

Obviously this will be a point in continuing dispute, since societies change, and since parts of it disagree. This is a political role for the school, whether it be for democratic citizenship as outlined in the social studies curriculum in the U.S., or for party membership in a Communist country. To the extent that there is disagreement within the society as to how it shall change, then one should expect disagreement to appear in the school arena, which it is currently doing in the civil rights movement in U.S. schools. We can also expect that this dispute will involve deep emotions, for people will fight hard for what they believe to be central to their society, such as the flag, civil rights, or preparation for marriage.

Transmission of National and Cultural Heritage

This involves much of the same conflict as in the above paragraph on social roles. Parents and other organized groups within the community, such as the American Legion, see the school as guaranteeing the preservation of precious traditions, as assurance that certain values and ideals will be kept alive. It is not surprising that groups within the community will fight passionately to see that a particular view of the Negro in American history is incorporated into the schools, that no member of an ethnic or national group is blamed in the textbooks, that pupils be required to pray, or that praying be outlawed. These are important points, felt deeply by those involved, and they wish to make sure of their place in history. The school is the place to write history so that future generations will remember.

Preparation of Manpower for the Economy

Parents apparently assume this, in terms of their own children, but rarely concern themselves with the overall supply problem on a national basis. This is usually the concern of national groups, such as unions, business concerns or associations, and especially the Federal Government. The unemployment rate and the growth of the national gross product are extremely important signs of national economic health. The Federal government must concern itself with school programs to train technical manpower, if it is needed; to undertake vocational programs which produce marketable skills; to turn out an adequate supply of trained scientists to carry out advanced national programs. It is here that the school encounters some considerable influence from Federally financed manpower training programs, which in turn alter the school's curriculum and affects the rewards it dispenses in terms of education for a better job.

On a personal level parents are keenly involved in the marketable skills of their children. At the high school level some 60% of U.S. students are now going on to college, and the marketable skill required is getting into a college of one's choice. At the college level there is more immediate concern with what kind of a job the student can get if he goes here or there, or majors in this, versus that. There has been a continuing debate about the value of a liberal arts program in college versus programs of more immediate vocational value. When colleges consisted largely of upper SES students the issue was not so keen because the possession of a liberal arts degree from the right college was a vocational ticket. As meritocracy increases, we should expect a sharper debate on the vocational aspects of college curricula. Why study philosophy and history when the big corporations want science majors and engineers?

Classification of the Potential Manpower for Selected Roles

As indicated earlier, this is an acute issue between the schools and the parents. If education is finally to become the real ticket to one's lifetime future, there will be desperate fights about who gets what ticket. The Negro parents who demand quality education (whatever that is) are saying, in part, they want an equal ticket for their children,and that it is the school's responsibility to produce what the ticket requires (such as reading at the elementary level).

Education is no longer a privilege. It has become a national birthright. It has become the only recognized avenue to future status. It seems to me that this is a crucial point in the reward system, and potentially a very dangerous one. It does not even matter whether or not this is true, as long as most of the community believes it, and it does. Each parent will fight like a tiger to insure the future status of his child. There is no room for educational relativism that suggests there are many roads to education, or that formal education may not always be the best thing for everyone. It is nonsense to talk about the beauties of non-formal education if the job market can, and does, demand a formal degree. On this point the parents are much more realistic than most school staffs, in my experience. Many teachers complain about the pressures from parents for their children to succeed in the educational system. It is very easy to be relaxed about a race in which you are not participating. The parents, quite correctly, know that it is a race beginning in elementary school, leading to the high school program and honors classes, to entrance into college. Grades do matter, and so do intelligence test scores, and achievement test scores. The entire issue of evaluation of a student's performance is already a touchy issue, but will become touchier, and one might predict, an increasingly political issue.

Parents are quite likely to turn the evaluation issue around upon the schools, and demand some measures of how adequate the education is. They will not sit still and let the schools judge their children when the reward is lifetime status, without questioning the ability of the school either to do a proper evaluation or to carry out an adequate educational program. The increasing costs of public schools, based on local real estate taxes, are causing parents and realty owners to ask: Why should we accept increased school budgets as necessary or good, just because the school says so? What will $500 per pupil buy in the way of an adequate education? Will $600 buy one any better in ways that can be demonstrated objectively? The schools at present do not have hard data to show that another $100 per pupil makes any difference at all in the educational output, and the current data of this study seem to concur.

The school has become the arbiter of one's future. But it also has become the classification agent, itself, of its own efforts and outputs. This amount of power is not likely to continue in the hands of an agency which is supposed to serve the community. The school has become not only the training agency, but also its own evaluative agency. It is questionable whether the schools can or should fulfill both functions, because their objectivity will surely be questioned. One could predict the growth of independent evaluative agencies, such as the National Assessment program, and also predict the opposition of the schools to any such move.

It seems quite probable that the evaluation of education, now that it has become a birthright and the only salvation, will be considered to be in the public sector by the community, and a federal agency, or an independent one, will monitor the efforts of the schools to provide appropriate opportunity for rewards.

Transmission of Appropriate School Behavior

As indicated earlier, there is often agreement between teachers and parents on the desirability of standards of school behavior, partly because of the generation gap in which parents and teachers are of the same generation. This is particularly true at middle and upper class levels where the insistence on such behavior may even be stronger from parents than from teachers. With parents of the disadvantaged, however, this has become something of an issue. If the school charges that such children do not behave properly, their parents are offended and may counter-charge that the teachers are discriminating against their children. Still, there is some recognition that certain kinds of behavior are necessary if one is to achieve social mobility, which accounts in part for some of the pressures for integration.

Related to this however, is the changing interaction between parents and teachers of the middle and upper SES. Fifty years ago, the immigrant held the teacher in awe, and strongly supported the teacher's right to demand appropriate behavior from the pupils. That view of public school teachers has changed drastically, even among the disadvantaged who now boycott schools where they view the teachers or school staff to be inadequate. Today, the middle and upper SES parent is likely to be better educated than the teacher of his children. Such a parent is no longer going to support the demands of the teacher, for he feels himself in a position to question such demands, as well as the effectiveness of such teaching. He may even view the teacher as his inferior, in terms of education, and he may be quite correct. If such a parent does not respect the public school teacher, he will tolerate much less in demands for behavior coming from such a person. He will support, instead, his child's challenges to the school in terms of behavior or of intellectual content. Many teachers apparently do not realize that they are viewed by parents as rather necessary evils in a system which controls rewards. Lacking respect for them, parents will tolerate them or manipulate them as bureaucratic functionaries so as to improve their children's chances for educational success.

Training for Discovery of New Knowledge

Ironically, many parents, particularly the well-educated ones, are much more insistent upon the scholarly goal of the school than is the school itself. It has been remarked by others that the trend toward rewriting the curriculum really started with scholarly fathers who, being American fathers, took enormous interest in their children's education and homework. Appalled at what they saw, they rewrote the curriculum on the theory that the schools should be intellectually respectable and should be teaching for scholarly curiosity. Their efforts to date have been seen by some as doomed to failure because the curriculum will be taught by teachers who are not intellectually oriented, not scholarly, and perhaps ill-educated to understand what they are to teach.

The intellectual leading edge, then, is on the side of the community, not on the side of the school. The schools are essentially anti-intellectual in nature. They have produced almost no knowledge, their innovations are essentially imitative, they attract a work force that is not intellectually directed (those that are, leave) and as Schaefer (1967) has emphasized so well, there are almost no intellectual rewards in the school system for the teacher. If a teacher starts with a scholarly interest, surely the bureaucratic regimen of the school will dry it up.

In addition to the goals of the school, the parents and the community have a goal of their own in relation to the school system, which is:

A Good Buy in Education

Parents and other taxpayers pay for the school system, so it is their system. They are its owners, as they see it. They are very interested in what good education costs, because it represents a substantial part of their tax load. In this sense, the teachers are their employees, although viewed sentimentally more often than not. The superintendent is definitely their employee. When the public schools are viewed as inadequate, parents move to a locality where they are good, or else send their children to private school, whether they can afford it or not. So parents clearly will pay enormous sums to get what they consider to be a good education. Despite all that can be said about the lack of data on quality education, parents may be more nearly right than the research worker in knowing which schools bear the appropriate reputation in the classification system. They are ingenious in finding out what the labels represent in the next step in the educational reward system. A public school official will generally defend his system as having certain facilities, or favorable teacher-pupil ratios, and may think a parent ignorant in choosing to send a child to an independent school the official never heard of. But the parent may know that a particular independent school, with poor facilities, may have a reputation in that part of the system which he hopes his child will enter.

So parents are educational shoppers and buyers. Lacking hard data by which to judge how good a school is, parents do what everyone else in the system has to do, which is to depend upon reputation. That reputation also makes the real estate market in suburbia. As a school system starts going down, usually perceived as having a poorer pupil input, parents move out and real estate values lower, and a new pupil input comes in, in an ever downward spiral of pupil input. Since the Coleman study, and these data as well, indicate that pupil input is the crucial variable, parents are quite correct in following pupil input when they shop for a school system for their children.

Goals as Seen by Pupils

Transmission of Skills and Knowledge

Yes, pupils expect to learn skills and knowledge in school. That is why they think they go to school. But the most common problem is that pupils see no relation between what they are asked to learn and what they imagine they will need, either later in their education, or when they are adult. Often this is due to their lack of information about what will be needed later on, but sometimes they are correct. Pupils have a very functional view of what is worth learning. If they believe it to be functional, they will agree to learn it, but they do rebel against learning what they think is useless nonsense. Much of what they are taught appears this way to them, from elementary through graduate school. They also become tired of teachers assuming that the teachers' judgment in this matter is infallible. Teachers are usually protective of the curriculum. It is rather holy, for it is their occupational substance. In my studies of the child's world of learning there appears to be little attempt on the part of teachers to explain why something is worth learning, except for vague references to its being needed at a higher grade. Most pupils think they should know why, but are so used to not being told that they will accept most assignments as dutiful slaves.

Preparation for Social Roles in a Particular Society

At the elementary level, pupils can't imagine that the school is serious in thinking it is preparing pupils for real life. To pupils, it is perfectly clear that there are two worlds at this age: the school world, and then the real world. One has nothing much to do with the other, as they see it. In high school, and certainly in college, there is increasing questioning of what their adult role will be and whether the school can or should prepare for it. It has probably always been true that college students are way ahead of college faculties in anticipating the roles they will play, or will fashion for themselves, so they must find it presumptuous that a middle-aged faculty dares to prepare them for the world which they, in their time, will make for themselves.

The obvious clash point here has been the notion on the part of some students that the university's role should change, and they have been trying to prepare the university for its social role in a future society. In these circumstances, perhaps the college has been a more reluctant learner than most college students. The symbol of Berkeley may be that students thought they had the right to challenge all of the school's goals from "a" through "g", which the college and community partly interpreted as only "f", in appropriate school behavior. This response, as has been stated in the press repeatedly, is the usual posture when bureaucracy is accused of being bureaucratic, or when its goals are questioned. Bureaucracy sees as its goals the perpetuation of its own procedures by an increased staff. It responds to challenges of its validity (at least schools do) by invoking the "appropriate behavior" theme. This suggests that the bureaucratic school does not really understand what the true threat is. It is a challenge of the school's goals more than to its procedures. The school responds by assuming that it must be the procedures which are at question, because anything else is unthinkable, i.e., never really thought about. To return to an earlier analogy, the captain of the ship meets his mutinous crew and tells them to button their shirts. After all, there is a proper procedure for informing the captain of complaints. What the captain fails to realize is that this is the proper procedure if this is mutiny.

Students are going to question the goals and methods of education more and more, just as their parents have become critical consumers of the educational product. The more educated the younger generation, the more they will be educated to ask educated questions about education. A bureaucratic response on the part of universities, or of public school administration, will surely tell us whether the school system has become anything more than a "fact factory" or a system very analogous to the post office system, with teachers as civil servants dispensing envelopes of skills and knowledge. Just as postmen are rarely capable of dealing intellectually with the contents of the mail they distribute, so may teachers have become, and hence the hopes of many for computer-assisted instruction.

Transmission of Cultural and National Heritage

History is frightfully boring to almost every elementary school child. (There are some of us who really doubt the advisability of teaching any form of history until after elementary school.) The past is dull to young children, and all muddled up anyhow in historical time. They appear almost uniformly disinterested in our heritage, or anyone else's, unless it concerns the usual interests of children such as food, the house, what they wore, and those things mysterious or bloodthirsty. They accept the notion that other people live differently, because, from their point of view, they think everyone lives differently from them, if "them" refers to the immediate family -- and it usually does at this age.

Children are of course very subject to enthusiastic contemporary movements, and can be taught slogans and emotional appeals with great effectiveness. They can be taught almost anything, in either an honest or dishonest way, in the sense that they will accept what the teacher demands at the elementary level. They are the best-natured prisoners in the world.

Preparation of Manpower for the Economy

Until high school, this is not seen by pupils as a school's goal, and even then it is likely to be in terms of the pupil's own vocational future. At college this may be more widely discussed, but I am not aware of it as an issue.

Classification of the Potential Manpower for Selected Roles

As indicated in the earlier discussion of parental goals, this is the crucial one for pupils. They soon realize they are in a competitive system, and how the school classifies them is critical to them and to their parents. Pupils do not understand the evaluation system used by the school at the elementary level, but realize they are being evaluated. Most schools have failed miserably to use an evaluation system of grades, numbers, or words, which communicates clearly to the pupil the criteria for evaluation and how he stands. This is partly because the school itself is confused as to the criteria, and partly because the school is philosophically confused about whether young children should be evaluated or not (which they are, constantly), or told about it.

The role of the school as classifier increases as an issue of dispute as the rewards given or withheld increase. The high school teacher or guidance counselor can make or break the next step in the educational system for an individual pupil. There is no more popular conversation among pupils than how unfair a teacher is. As the stake of the game increases, pupils are very likely to take a more active role in criticizing the basis for evaluation, and also to turn the evaluation back on the teachers, just as parents turn evaluation back onto the schools. This has already been seen in several campus attempts at rating teachers. If the system of evaluation determines a pupil's right to entry, he has every reason to question the basis for evaluation, for he is fighting for his future status. This will become even more of an issue as the proportion of students entering graduate school rises, for the problems of admission to college will simply be moved on to graduate school.

If these predictions prove correct, it will hasten the movement to establish better criteria for educational products, and for the evaluation of individual student performance.

Transmission of Appropriate School Behavior

We need only to underscore, in addition to what has already been said, how deeply pupils resent the school's attempts to control their behavior or their appearance.

From a pupil's point of view, he is a legal prisoner in school. The school does not list as its goal the legal detention of minors, but it spends a fair amount of its time doing just that, including paying salaries to attendance officers and using public funds to prevent dropouts. It is difficult to imagine an adult reacting so peacefully to such a system of enforced attendance in a classroom which may be dull or harsh. The simple fact that children legally must attend school is really at the heart of much of the problem from a pupil's point of view. One fifth grade pupil asked: "Why does everyone else in the world get paid to work except us?"

The compulsory attendance law, in retrospect, may have been one of the worst errors we have made, even though its intent may have been good. The term, compulsory education is a contradiction in terms.

Viewing themselves as prisoners creates a certain amount of suspicion on the part of pupils as to the so-called rewards within the school system, particularly the rewards of supposed freedom. This is understandable if we use the model of a penitentiary and imagine ourselves prisoners. We would view the warm and friendly attempts of the warden with considerable suspicion, just as pupils view those of their principal. If the warden promised us freedom of choice in some matter, we would suspect a trap. So do pupils, and they are often right, for the school has not the slightest intention of giving true freedom to its prisoners. Can one imagine what would happen, for example, if pupils were permitted to attend classes or not? Can one imagine an elementary school staff considering this proposal for one serious minute? The answer of course would be that many pupils would not attend classes, would create a problem in the halls or on the playground, or worse yet, not even come to school. Since the school is supposed to be the warden of children from 6 to 16, the community would rise up in arms, the police would be overwhelmed, and parents would want to know where they children were. Unthinkable!

Instead, the school dabbles in hypocritical rewards of pseudo-freedom. The teacher offers the children their choice of projects, but somehow the choice is guided. In art class, children are invited to paint what they like, but the pupils report that they knew the permissible range was small.

One can hardly exaggerate the fear children have about the enormous authority of the school. In some ways, the school does have more authority than parents, for it can legally force a child to go to school if the parents fail to do so. There are a million tales among children of how a pupil got into trouble, was embarrassed, or was punished, by the authority of the school. These fears are real, and perhaps even more so now that the school will be the only arbiter of the future.

This is to emphasize, then, that children basically distrust school, their teachers (even the best ones, for after all they are in authority) and their principals. Waller (1932) was absolutely right in stressing his point about mob control. In a contemporary junior or senior high school, observe the corridors between classes. You will see teachers standing at their doorways, and the principal and his staff patrolling the corridors. The teachers bark out orders:

"Quiet down there. Stop that fighting. Get into the classroom, the bell has rung." The principal and teachers know that if they were not there to maintain order, there would be a mob scene in two minutes. This is also true in study halls, one of the wildest creations in education, in which almost no one studies and the teacher's job is to maintain mob control for forty minutes. It is war every minute. To be quiet and not move is hard for any youngster, but it is almost impossible in groups of youngsters. Many a teacher has failed to learn this lesson until he called an assembly of several classes, dismissed their teachers, and found a riot on his hands.

School is war, cold or hot, from the point of view of the pupils. Only occasionally is this admitted by the school staff.

Training for Discovery of New Knowledge

Following the above, perhaps it is not necessary to say that most elementary and high school pupils do not see training for the discovery of new knowledge as a goal of the school. They have almost no experiences with their teachers which would expose them to this goal. They do not see teachers doing scholarly work. They see them as custodians, as purveyors of doses of information, as wardens. It does happen of course, but it is far too rare that a teacher can intrigue the mind of the average high school student. In more affluent systems, this happens more frequently because of the pupil input and the corresponding higher level of teacher.

One of the reasons why pupils do not believe that schools are there for scholarly reasons is that they would find that model hard to reconcile with a jail. Jails exist to hold people in custody, hopefully to reform them, but rarely do they pursue knowledge for its own sake. This is why many pupils react to what they see as phoney in the pseudo-intellectual postures of the school. Further, scholarly behavior on the part of pupils is not especially rewarded.

Good behavior is (but one does not even get time off for that), and so is grinding out the work, but real curiosity is not rewarded by many teachers. There are exceptions, of course, but how such teachers survive in the school system is a mystery, if indeed they do.

In addition, the pupil has his own goal, which is:

To Survive in School

Not to fail, not to be kept back, not to be singled out for punishment, are the overwhelming goals of many pupils. Since they do not understand why they study what they do; since they do not understand how they are evaluated; since the reward and punishment system of the school is a mystery like Kafka's castle; the overwhelming motive is to survive. One lives by one's wits, by reading cues, by relying on pupil gossip and rumors, by comparing notes with the other mystified prisoners.

Later on, achieving the next reward takes over. But even in graduate school, there is always that deep distrust of the school, of the faculty's evaluative function, of its mysterious criteria, and the fear one may not survive.

The Model

The foregoing and overlong discussion of some aspects of the reward systems in American education has outlined certain characteristics of the model as it exists, and they are:

Input

The input is the total population, and it is compulsory.

Process

Largely because of the size of input, and the size of the system, the process has become essentially bureaucratic. The members of the educational staff are also torn between the purposes of the process. Are they supposed to be custodians, functionaries, wardens, teachers, or scholars?

Output

The output, whether or not it is educated, is classified. The classification is essentially vertical, meaning that if one does not graduate from high school, one will not gain any lifetime status as it is commonly understood; the only means of achieving status is to move up vertically through the educational system. Seriously lacking are horizontal choices at each vertical step, choices in terms of the economy and therefore in status.

Utilization

Although essentially vertical until graduation from college, utilization will be increasingly vertical after graduation. Horizontal choices below the community college level will not exist.

What Are the Implications of Such a Model?

Such a model holds out little hope for the conditions under which we have known scholarly life to flourish. More and more the demands will increase for functional (vocational) education. The scholarly life has never been a widely popular one. Pupils are apparently doing better at vocational education than ever before, by which I mean they are reading better. To wish for a return to the intellectual life of the "good" school, where teachers were teachers, is not practical, and I suspect, not being an educational historian, was rarely true anyhow. We have a mass educational system and it will probably have to be run like most mass systems. The question is: Which one? Is the best model the postal system? What are the special characteristics that would suggest an appropriate analogy?

My best guess is that we will turn to the business model, as many people believe has already happened. We will find the models of training that exist in industry and in the armed services appropriate. We will learn to teach limited units of a fairly practical nature (reading is practical) to large numbers very efficiently, using whatever technology can offer. We will learn to process children in this manner, as we have learned to process employees and servicemen. Although many will find such a model horrifying, I do not find it so, largely because we may be able to find better educational methods for the teaching of skills, and also better means of evaluating what we are doing. The "hearts and flowers" school of teaching children will be appalled, but the conditions for that kind of education seem to have disappeared anyhow. More programs like that of Bereiter will appear.

Teachers will be technicians (they already are technicians as far as status is concerned, but they lack the technical skills). Children will learn skills, and that is important, and they may find the functional, efficient, approach with clear evaluative procedures more to their liking than the existing muddled and mysterious one.

The independent schools will perhaps be the only holdout for the humanistic tradition in education. The private colleges will also, but the state universities will probably have to accommodate themselves to the realities of good technical instruction as contrasted with the all too common inferior graduate-student instruction.

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XII

ROLES AND SOCIAL EXPECTATIONS IN SCHOOL AND WORK SYSTEMS

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Introduction

The aim of this paper is to show how the educational system, through the operation of various agents and procedures, provides the pupil with a set of social expectations, attitudes and skills, that crucially affect his behavior, decisions, success and contentment when entering work. An attempt will be made to list these agents and procedures and illustrate what is known of their affects. These features of the educational system are held to affect the skills, attitudes, values and aspirations attained by the pupil during his school experience, and these, in their turn, will influence the way in which the pupil makes the transition from school to work. It is not proposed, in this short paper, to consider in depth the total work situation, nor changes that occur during the course of the work career. Similarly, there will be no discussion of how the school prepares pupils for further education. The material quoted and ideas suggested derive almost exclusively from British work, but many of the principles are generalizable.

Interaction Analysis and the Educational Process

The argument for employing an interactionist frame of reference for studying the educational process has been well argued by Himmelweit (1966). The implications of this point of view are manifold. This type of model becomes all the more important if we are to consider the relationship between the school-lives and work-lives of young people. The use of this model, and the complex techniques it implies, may help us tease out the complex strands of causal relations in which, for instance, a pupil's personal characteristics may both determine his reaction to school and the reaction of the school as an institution to him, and in turn be changed by the demands of the school.

The variables may be classified broadly to show the scope of this form of analysis into five main classes, five matrices of

(a) Personal variables describing the student;

(b) School-structure variables, such as the school's size, method of grouping, time available, curriculum, etc.;

(c) Personal variables describing the main agents through which the school operates, chiefly the teacher;

(d) Interaction variables, such as the style of teaching, mode of providing knowledge of results, etc.;

(e) Support variables, chiefly concerned with the structure and attitudes of the family and neighborhood.

There are complex relationships within the groups, between the groups, and between the groups and outcome variables. The value of the classification lies chiefly in the acceptance of the view that education is a dynamic process, and that in terms of the input-process-output model, the process variables should be not simply taken for granted, but examined in depth. Finally, because the product of these interactions, the outcome, is an array of skills, attitudes, values, norms and concepts of the world, it is important to regard schooling as a process of socialization.

Agents and Procedures of Socialization at School

There has been increasing discussion in recent years of the socializing, as opposed to the purely academic, functions of the school; Sealy and Himmelweit (1966) have summarized the British literature in this area in a report entitled "The School as an Agent in Socialization". There is one main agent of socialization in the education system, the teacher, but he attempts to achieve these aims by performing a number of roles and by engaging in a number of styles of role behavior -- as controller, adviser, friend, etc. The teacher himself is part of an ongoing system in which a number of crucial elements can be isolated, such as the school's structure, style, implied values and status as an institution. In the ensuing sections, I shall discuss each of these elements in some detail, outlining modes of action and associated consequences for the pupil.

The Teacher's Role as Teacher

One important way in which the teacher acts upon pupils is by direct injunctions. He has an idea of what he wants to achieve and a number of devices and sanctions at his disposal. A number of authors have investigated these aims, and it is significant that teachers themselves often see their roles of inducing particular activities, values and norms as of paramount importance (e.g., Taylor, 1962; Stevens, 1960; Biddle *et al*., 1966). In this process of direct indoctrination, the teacher's personality and value systems are important variables. Studies by Goodacre (1965), Bacchus (1962) and Mays (1962) have all suggested that certain types of schools attract teachers of particular personality types, and these personality types in their turn affect the teacher's views of his role. Goodacre and Bacchus have both shown how the more authoritarian teachers at Secondary Modern Schools, especially in deprived neighborhoods, actually tend to emphasize and exaggerate the negative features of their pupils and their backgrounds, and to stress their own roles as controllers.

This aspect of the teacher's role is that of providing explicit direction and advice. One feature we need to look at in detail in considering the transition from school to work is the relevance and sufficiency of this advice and the possible consequences of its loss on leaving school.

The Teacher as Model

As well as telling pupils what he wants them to do, the teacher is also a model. He, himself, is a living examplar of his particular social role; he has a particular social status, a particular personality. Indirectly, he provides other models for pupils' behavior by the provision through his teaching of real and fictional "heroes" for pupils to examine and identify with. He is a source of rewards, punishment, support, acceptance or rejection. Studies carried out in many places have shown how salient dislike or rejection of the teacher is in the broader syndrome of negativism, and how dislike of school seldom co-exists with fondness for, and identification with, teachers.

Although implicit in the formulations just presented, another important way of viewing the role of the teacher vis-à-vis the pupil is as that of interpreter of the social system. He clearly rewards behavior and requires values that he regards as somehow functional in his pupils' lives. Carter (1966) has reviewed the evidence on education as a preparation for work. Similarly, Sealy and Himmelweit (1966) have reviewed a large body of evidence suggesting that different schools or types of schools both engender and respond to, different attitudes and values in their pupils. In comparing the attitudes of pupils who attend selective (Grammar), non-selective (Secondary Modern), and Comprehensive Schools, they concluded that

(a) Grammar School pupils were more future-oriented and showed the greatest breadth and openness of attitudes;

(b) Secondary Modern pupils showed the greatest concern over academic success or failure, the highest general anxiety and the strongest tendency to present favorable responses;

(c) Comprehensive School pupils showed the greatest concern with interpersonal interaction and self integration.

The School Structure

The structure of the school is an important variable in socialization as reflected in its policy on streaming (or differentiating amongst pupils by attainment or educability), in its provision of a style of teaching, or in the fact of its status as a selective school, an independent school, or a receiving school. Douglas's (1962) studies exemplify those in which the consequences of streaming for the pupil are reported; he has strikingly shown the effects of streaming in terms of the creation of groups identified by failure and accumulating educational retardation. Himmelweit (1966) has shown how schools use the strategy of streaming in accordance with the needs and problems of the school. Similarly, a large array of evidence was reviewed by Sealy and Himmelweit (1966) showing the consequences of attendance at particular types of schools (Secondary Modern, Comprehensive, or Grammar), or at schools with particular styles of teaching (e.g., progressive versus traditional, or single-sex versus co-educational secondary schools). Similarly, case studies of particular schools have suggested fruitful lines of research into how the school adapts to its intake and performs functions appropriate to it.

Here one important aspect of the function of school structure should be stressed. It provides a series of paths, obstacles of graduated difficulty, goals and strategies for the child. Each of these can be seen as having particular social functions and providing the pupil with credible success-experience. These external props to his motivation at best ensure that he knows where he is going, what his next goal is and how this goal relates to subsequent goals, and that support and advice are available should he be in difficulties. Thus with minimum internal motivation the child can be guided safely through a series of choice points consisting, for example, of successive examinations, until he is finally settled in a career. There are, however, a number of ways in which the pupil may find himself in a situation he is ill-prepared to meet. He may find himself confronted by external obstacles, such as examinations, with inadequate specific preparation in the required syllabus despite a good general education. Similarly, he may find himself studying subjects in a strictly means-end fashion (e.g., as in schools which sample A- and O-level examination syllabi to find the ones with the easiest papers and best pass-record), in which he receives no inspiration or sense of cultural standards beyond the minimum required for examination success.

Some of the socializing activity of the school can be considered in the same way: the attitudes and values the school attempts to induce may be of the most abstract nature, with little advice about conduct, or conversely consist of instruction about conduct with little emphasis on the structure of standards to which such behavior applies.

In summary, then, the school acts as a socializing influence through the deliberate efforts of teachers, through their rules and advice, through the models they provide for pupil-identification and through information and cues they give as interpreters of the social system. The school provides a structure, curriculum and style of teaching which in turn aid this process. What are the consequences of these activities?

Dependent Variables in the Socializing Activities of School

There are a number of changes in the child's outlook that can be ascribed to the educational process, or to differential effects of particular styles of education. However, this should not be interpreted as implying that school is the sole or even main influence, nor that the educational system operates in a vacuum. It is, of course, an interaction in which the personality and attitudes of the pupil both help to shape the teacher's activity and affect the impact of the teacher's efforts.

The variables conventionally studied in this context have been attitudes, opinions and values, frequently studied by open-ended techniques, such as sentence completion or essays (cf. Veness, 1962). Similarly, a number of studies have suggested the possibility of the use of primary personality traits as dependent variables in comparative studies of different schools (cf. Hallworth, 1961; Callard and Goodfellow, 1962). Various students at the London School of Economics, following the work of McClelland, Atkinson and others, have stressed the importance of achievement-motivation and level of aspiration. A final range of significant variables is suggested by the comments of Carter (1966) and Newson (1964), who have described what might be called styles of social participation produced in certain children by some types of educational process. In this connection, four styles seem to be discernible: activity versus passivity toward society; resistance to, or welcoming of, change; flexibility versus rigidity; and finally the breadth of experience and sympathy. All of these variables are affected by various types of school structure, teacher-example, and style of teaching, as well as by family and peer influence. In their turn, they crucially affect the process of transition from school to work.

The Study of Transition

In studying the movement from school to work the many considerations will be grouped under four headings. First comes the process of choosing, seeking advice and information in varying degrees from various sources. The second is the process of transition itself and all the changes in views, opinions and attitudes involved, as well as the apparent effects of the new commitments. The third area of importance is the consideration of the person in transition, how he views and adapts to the new situation, and how it affects him, analysed into particular points of vulnerability for the boy in which extraneous aspects of the situation may have serious effects on his behavior and capacity to adjust to the change. The final area is the detailed analysis of the relationship between various aspects of educational, family and personal experience related to adjustment to work. In the remainder of this paper each of these features of transition will be taken up separately in some detail.

The Process of Choosing

Ways of choosing a job go all the way from the civil service candidate who attends a weekend selection board in a country house to the boy who happened to be passing a factory, went in on impulse, and found himself starting his apprenticeship on the following Monday. It is essential to examine the sources of advice and information used by children in making their career choices. Jahoda (1952) reports that pupils leaving school and looking for a job find most information from sources other than the school or the Youth Employment Officer: only in 34% of the boys and 20% of the girls studied did the children not receive information or suggestions from parents. Carter (1966) described the extent to which children are dependent on parental or peer advice in choosing their first job; he also describes the quality of some of this advice, particularly in terms of what to avoid or what is impossible.

Jahoda (1963) also concluded that the choices of job made by pupils in their last years at school are extremely unstable, and he described the variety of ways in which they handle advice given them by Youth Employment Officers, sometimes taking their advice but insisting that the officer was opposed to it from the start. It seems, therefore, that in one crucial aspect of the transition parents and peers are seen as the chief source of advice, rather than schools. Vigorous pleas for an efficient careers advisory system in schools have frequently been made, and the schools themselves have tried many ways of remedying this, such as allowing last-year pupils to spend short periods in different work situations such as factories and offices (Carter, 1966).

Jahoda's negative evaluation of students' choices in their last months at school deserves further attention and Veness' study provides some interesting information in the following table:

Table 1. Jobs Nominated and Entered*

Boys			Girls		
	Nominated in 1956	Entered in 1958		Nominated in 1956	Entered in 1958
Apprentice	52%	46%	Clerical	36%	43%
Forces	15%	8%	Professional	16½%	6½%
Professional	12%	7%	Distributive	14%	19%
Unskilled	6%	14%	Apprentice	13%	6½%
Clerical	5½%	12%	Nurse	8%	2½%
Distributive	1%	4%	Unskilled	2½%	12%
Miscellaneous	2%	1%	Miscellaneous	2½%	1%
Don't Know	6½%	8%	Don't Know	7½%	9½%

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*From Veness, 1962.

These results suggest that pupil choices are not wholly unrealistic. They tend, as one might expect, to nominate more exciting and higher status jobs than they actually take up, whilst in general they may be realistic. Jahoda (1952) claims in particular that their choices are undependable. These findings may suggest simple lack of information about work possibilities, or the real nature of actual employment sought and available; it may be that the attitude to work engendered by school is unrealistic.

In studying how pupils gained the idea that they might like a particular job, Veness classified their answers as of traditional origin (e.g., family jobs), inner-directed (e.g., "I saw a film about it"), and other-directed. In comparing Secondary Modern, Technical and Grammar School pupils, she found the results shown in Table 2.

The outstanding feature of these results is the overwhelming frequency of "inner-directed" reasons provided for choice of job, regardless of type of school attended. This is of some significance in considering the socialization processes described earlier, namely, that school creates an atmosphere in which what Veness calls inner-directed ideas are thought to have some intrinsic validity. Even if the students did not actually think up the ideas for themselves, they felt bound to say they did. If school does not support this way of viewing the transition with needed skills and knowledge, the resulting situation is likely to be somewhat anxiety-provoking for the pupils. Of importance in this connection also is the fact that schools and other agencies frequently have the task of curtailing the effective range of their pupils' choices because of local employment problems. This can exacerbate relationships at this difficult period and reduce effectiveness in helping the youngsters.

Table 2. Origin of Job Choice*

	Boys			Girls		
	Secondary Modern	Technical	Grammar	Secondary Modern	Technical	Grammar
Traditional	19%	11%	14%	14%	15%	5%
Inner-directed	52%	51%	54%	55%	32%	59%
Other-directed	29%	38%	32%	38%	53%	36%

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*From Veness.

There is a considerable practical problem in this process. The pupils who need advice about work the most - as opposed to advice about further education - are those who leave earliest, with least qualifications and with least actual choice of types of job, merely some sort of unskilled or semi-skilled occupation. These pupils are characterized by the most negative views about school anyway. The next table shows the correlations between age of entry into work and various aspects of educational experience. The results are taken from Himmelweit's as yet unpublished follow-up study:

Table 3. Age of Entry into Work and Educational Experience

	Entered Work at an Early Age N=408
Low level of attainment	.63**
Low status of first job	.56**
Low status of aspired job	.41**
Low participation in school	.21**
Parents showed little interest in progress at school	.26**
Felt bored with school	.16**
Felt teachers did not like him	.11*

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*Significant at .05 level.

**Significant at .01 level or lower.

Clearly youth who enter work early do so without qualifications and with rather negative feelings about school and about teachers.

The process of choosing and obtaining a job is performed by the use of agencies other than the school in most cases. Less than 20% of school leavers in our study took jobs determined by the Youth Employment Officers (Jahoda, 1952); in another study the results in Table 4 were obtained.

Table 4. Sources of Information in Job Choice*

	Percent Having Recourse to This Source[1] Leaving in:	
Source of Job	September N=152	May-June N=307
Own initiative	61.5%	46%
Youth Employment Officer	31%	31%
Parents, friends (informal)	27.5%	13%
Teachers	1%	5%
Other	19%	30%

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*From Jahoda and Chalmers, 1963.

[1] A student may have recourse to more than one source of information.

The Process of Transition

The course of transition from school to work is not perhaps as difficult as the last remarks might suggest. Many children make an easy change, and it is important to recognize this. The first crucial problem in going to work lies in accepting the work role and awareness of how it differs from school. Carter (1966) estimates that well over two-thirds of school leavers move smoothly into work, some (about half of these) because they are going to work they wanted, backed by favorable school performance and encouraging families, others, because they expected little from school and expect little from work; they "quite liked" school and are not actively dissatisfied with the jobs provided for them. Here the essential element in a smooth transition seems to be not to expect too much, either from school or work, and certainly not to expect the former to be relevant to work. Similarly, what makes work tolerable are the "fringe benefits" - fellow workers, lack of challenge, or merely the provision of enough money to lead a pleasant life. Any heightening of expectation - for instance, that work is exciting, or full of prospects - may be dangerous, if reality refutes this. Here the processes of instruction of pupils must bear some relevance to the likely structure of events in the later work situation. Take these data, for instance, from Sykes' (1965) study of the attitudes of clerical and manual workers:

Table 5. Question: "Would Promotion Cause Trouble at Work?"

Answer	Clerks	Manual Workers
Yes	0	95
No	91	0
?	5	23

Surprisingly, manual workers were unable to deny that promotion would cause trouble. This comment on the role of the worker would cause considerable conflict to the pupil educated to seek preferment in a competitive environment. Sykes' data may be extreme, but the principle remains the same.

The start of work produces changes in interpersonal behavior. There seem to be two important elements here, one concerns the relationships existing between holders of power, the other values.

An interesting anomaly exists in the nature of freedom and sanctions: at school the teacher possesses relatively weak sanctions, apart from having recourse to the law; at work the supervisor has immediate and powerful sanctions in terms of distribution of work, control of overtime (i.e., extra earnings), and ability to discharge workers at short notice. These sanctions are immediate and sometimes arbitrary and painful. The behavior required in relations between teacher and pupil is usually that of considerable formality; that occuring between foreman and worker is often of utmost informality. The behavior permitted between pupils is subjected to many, often arbitrary, controls; that permitted between workers sometimes has insufficient constraints even to ensure safety and, certainly, no constraints on the use of ridicule or abuse. This paradox, of apparently greater freedom with more immediate sanctions, is a disturbing one for many youngsters.

A second aspect of the change in interpersonal relationships in going to work concerns the relevance of values and ideals, taken for granted at school, to the work situation. Here the family and, especially the peer group, clearly play an important supporting role in softening the blow of reality when the youth goes to work. Without this assistance the transition from school to work would be much more painful, because of school's relative detachment from the values of the worker at work.

Palmer (1964) has exemplified these ideas in his study of job adjustment over the first six weeks of work. Liking for, and good adjustment to, work were correlated with being popular at school, having good academic achievement, harmony in father-son relations, the presence of other young people on the job, and doing the work expected and desired. Of those boys 50% reported that their chief work problems concerned their relations to other workers and the boss, a further 9% reporting the boss as the only source of work problems; 18% each reported either no problems or only problems with the work task.

In this process of transition, very real changes are required in the self-integration of the individual, if he is to adjust satisfactorily to his new environment. He frequently has to learn new strategies for dealing with others, a new level of impulse control as he enters a situation in which most others are physically stronger than himself. In this connection it is clearly valuable to find some intermediate stage between school and work, such as partial further education, on-the-job training, etc.

The Person in Transition

An individual's adjustment to work and response to the difficulties of transition are partly affected by his personality. He has certain expectations, capacity to tolerate difficulties, and personal conflicts. The types of difficulty encountered in the first reality shock period of entering work are manifold: adjusting to the new level of physical activity, learning to dispense with all the breaks and intervals provided at school, working out the relative status of co-workers, and getting habituated to the greater freedom, particularly in aggressive and sexual matters, of conversation.

For some children (Carter, 1966) the change is made worse by their own immaturity or lack of confidence and by parental over-protectiveness (e.g., the mother taking the boy to work on the first morning is not unknown). The transition to work frequently occurs in middle adolescence, when there is considerable conflict about social roles and values. It is noteworthy that in the United Kingdom the peak age for the occurrence of many forms of delinquency coincides with the last year at school and the first year at work.

Musgrove (1964) estimated that 32% of Secondary Modern boys showed high role conflict; girls (12%) showed considerably less conflict. The techniques used were limited and the findings, therefore, merely illustrative; it is clearly important to investigate this area more comprehensively. Other aspects of personality have also been emphasized in this connection, such as self-confidence, fear about one's own inability, and fear about never achieving the desired jobs. The dilemmas of adolescence and the nature of the contrasts between school and work leads to the identification of a number of points of vulnerability, to use Hemming's (1966) phrase, in the process. Some of these points are purely outside the boy's control, like increased levels of unemployment in a particular locality or at a specific time. The experience of leaving school only to find that one is apparently unemployable is a traumatic one for many youngsters. The problems of unemployment exemplify the general difficulty of moving from a situation of maximum control to one of minimum support from any social structure. Suddenly, much more is left to the boy's own initiative and responsibility.

Physical problems, too, can be acute in this first experience of work. Many youngsters report great exhaustion, in the boys from unaccustomed physical labor, the girls from being on their feet all day. Much adolescent drug taking (e.g., drinamyl) can be directly related to the conflict induced by having access to pleasures through their earnings which they feel too tired to enjoy. Many acute problems of readjustment exist for the handicapped youth - the epileptic, stutterer, sub-normal, etc. They add to the already possibly tense situation provoked by inter-generational conflict.

Occupational Adjustment

Another way of looking at the process of transition and at the relationship between experiences at school and work is to look for the antecedents of occupational adjustment. Some of the most thoughtful work in this area is that of Herzberg (1959), who has claimed that the aspects of work which cause satisfaction are qualitatively different from those which cause dissatisfaction; thus the nature of the work, level of responsibility and chances of advancement are all viewed as potential satisfiers and are irrelevant to levels of dissatisfaction, whereas company policy, and administration, the nature of supervision, working conditions and salary are all seen as potential dissatisfiers and irrelevant to satisfaction. This view has been challenged by Ewen (1964) who reported that for insurance agents managerial interest, company training policy, and the work itself all acted as satisfiers (i.e., discriminated satisfied workers from the rest), whilst salary and prestige were both dissatisfiers and satisfiers (i.e., discriminated satisfied, dissatisfied and neutral agents from each other). This model makes a starting point for a detailed inquiry into what educational and other experiences are likely to enhance the effects of satisfiers and dissatisfiers. Such a study has yet to be performed adequately on school leavers, but there is some evidence accumulating from Himmelweit's follow-up study that is of some relevance.

Eight criteria of occupational adjustment were studied:

a) Mean liking for jobs held
b) Mean liking for boss over all jobs
c) Mean liking for workmates over all jobs
d) The feeling that one's career was not progressing as well as hoped
e) The perceived promotion prospects of the present job
f) The perceived fairness of promotion procedures in the present job
g) Level of entry into work
h) Level of present earnings.

An attempt was made to predict the position of over 400 boys on these variables, using as predictors some information obtained when the boy was 13 years old and some, including retrospective views of school and early family life, when he was 23 years old. The present job referred to the one he held at the latter age. The information used related to educational experience, personality, family relations and early work experience. The data are very complex and only brief summary can be attempted here.

Overall liking for work, boss and workmates were quite highly intercorrelated (from .24 to .28); however, each of these seemed to relate to different groups of antecedent variables. Liking for job was correlated with educational attainment, liking teachers and feeling that he left school at the correct age, and these correlations held even when social class, level of first job or type of school were partialled out. Liking for boss and workmates was correlated with similar educational variables, but the correlations tended to vanish when level of first job or type of school were partialled out.

Personality variables of high extraversion and low neuroticism were found to correlate with liking for work, regardless of the effects of social class, type of school and level of first job. These variables of personality had no significant correlation with attitudes to boss or workmates.

Attitudes to workmates, particularly, were found to correlate with a number of variables concerned with family relations, and several of them survived the effects of partialling out social class and type of school attended. In general, disliking workmates was associated with poor family relations, and lack of warmth, communication and common interests between parent and child; this compares interestingly with the data on sociometric measurement in school, in which the tendency to be rejected by his fellows correlated highly with similar indications of disturbed social background.

In general, it seems that attitude to work is determined more by personality, attitude to boss more by educational and occupational experience, and attitude to workmates by experiences in the family. This view is a slight exaggeration, but gives a flavor of the findings.

Age of entry to work, especially, and level of present earnings were both related to educational and occupational experience to a very considerable extent. Early starters at work tended to come from lower status families in which relationships were generally rather poor. The variables relating to prospects and fairness of promotion were virtually unpredictable on the basis of previous experience or personality, suggesting that boys' reports here may be more directly relevant to their situation than to any habitual mode of evaluation.

Conclusion

This brief review of the problem of transition from school to work has shown many interesting lines of research, in particular, it leads to a consideration of how far a person's role as a student differs from the role behavior characteristic of most work situations. The role of a student might be described as the total implications of his position in the particular social institution of school, it refers to what he feels he is, where he is going and whether this progression is facilitated or impeded by the processes of education; it refers to what sort of constraints are placed upon him and what options are open to him. Direct comparison can be made between school and work on these issues and problems for education revealed thereby.

First, with regard to objectives, these are relatively clear in education, in terms of examinations to be taken and assignments to be met, whereas in work they are often relatively unclear. However, in work the paths to be followed to these objectives are often set out in meticulous detail, whereas in school they are often not so clear, and it is not easy, frequently, to make students see the relationship between what they are doing and their ultimate goal. In work, the reverse applies, it is very hard to see what the purpose of all the detailed actions is. How far, and to what sorts of pupils, this situation is disturbing and anxiety-provoking is a task for research to uncover.

Secondly, direct comparisons between work and school can be made in terms of the sanctions and controls operating the two situations. As we have seen, these operate in characteristically different ways in the two situations, and what evidence there is suggests that youngsters are relatively unprepared to meet the change. Other comparisons can be made in terms of the experience of having or not having freedom and choice, responsibility and variety of possibilities available.

The educational system can be analysed into two main classes of variables, those relating to the structure of the school and those relating to the roles of the teachers; however, these are classifications of convenience, and do not imply independence of operation. Similarly, all of these can be viewed through the eyes of the pupil, the teachers, or an outside observer. It is likely that mismatches between these perceptions will occur. The structure of the school is defined as the systematic ordering of life within the institution, devised to further its aims. A possible model for examining these deals with paths, obstacles, strategies and goals, each in turn related to a particular aspect of the school organization and each with its dangers. Thus the paths include the curricula followed, annual promotion, etc., among aims of which is the provision of clarity of direction for the process. Insufficient sense of direction in the curriculum can produce anxiety through uncertainty; too tight a definition of these paths causes an excessively "narrow" view of the subject matter and hostility through too much control. This sort of analysis can clearly be extended throughout the school system and lead to the identification of a system of variables relating to school on the one hand (the nature of the organization, the emphasis placed on various aspects of it by the staff) and, on the other hand, variables reflecting student reactions (anxiety, expectation of success or failure, the feeling of stress, anomie or purposelessness).

Added to this is another complex of variables defining the role behavior of teachers, in their own, the pupils', and the outsiders' view. Here we can isolate, first, the role of teacher, using direct explicit methods of indoctrination; secondly, the role of interpreter, conveying information and values indirectly through his own behavior, choice of teaching content, presentation of views of society, etc.; and thirdly, the role of friend, in which his personality and the relationship between him and his pupils are crucial. Also relevant to this last role are the ways in which he, as a person, handles his own role conflicts, concerning the use of controls and the need for salary, promotion and status. In all of these ways the school and the teacher influence children's values and are a source of information and help in the process of transition to work.

The transition can be described in terms of three main areas: first, the process of making a choice, analyzing sources of information, degree of reality orientation in choosing, and what happens to long-term and general aspirations and ambitions when the actual move to work has to take place. Secondly, it is possible to describe in detail the actual transition, acceptance of new task roles as well as adaptations to interpersonal role behavior; in the course of this process it is important to attempt to estimate the benefits and injuries resulting from the shock of change. Finally, it is necessary to define the person involved in this transition, his attitudes, personality and conflicts, and to define particular points of vulnerability.

This analysis can be filled out in much more detail, providing descriptions of the array of significant variables and the types of relationships expected between them. The aim here has been to build up a framework for the search for relevant variables.

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XIII

RESEARCH ON SELF CONCEPT: DEFINITION, ASSESSMENT, AND RELATION TO SCHOOL ACHIEVEMENT

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Overview

The notion of self concept has become increasingly prominent in the literature of education and psychology. The prominence is evidenced by the comprehensive survey of pertinent research literature on self concept covering the period 1949 to 1958 (Wylie, 1961); the reviews of self concept research and thinking appearing with increasing frequency in the professional psychological and educational literature (Wrenn, 1958; Strong & Feder, 1961; Crowne & Stephens, 1961); and the work in career development, notably the Career Pattern Study at Columbia (e.g., Super, 1963) and the Harvard Studies in Career Development (e.g., Tiedeman & O'Hara, 1963).

The notion of self concept has vital social relevance and has been used extensively in discussions of the goals of education and of mental health. The research literature on Negro self-image, for example, was cited in the 1954 Supreme Court decision on school desegregation. Indeed, there is an important branch in psychology which has long considered the self concept as the most important determiner of individual behavior. As such, its influence on achievement in schools has been a natural outgrowth of concern for psychologists in education.

This paper is an attempt to assess the state of the art of investigating and establishing knowledge about the notion of self concept and, more specifically, to consider its relationship to achievement in school.

The Construct: Identification, Specification, and Definition

The identification or specification of self concept as a variable has been fraught with difficulties. The problems, however, are not peculiar to this notion, but, rather, involve the very definition of a variable in the social sciences. The problem of definition in the social sciences is different from that of the physical sciences _if_ the latter is viewed as an area wherein particular discrete phenomena may be isolated and measured. The specification of the notion of self concept is related, no less, to the basic problems of psychology as a science.

It would be neat were we able to present established definitions of self concept. But we cannot. In the research literature of psychology, for example, self concept has been used as a synonym for personality, for person, and at the other extreme, as one element in the total personality structure. The problems are of such immense proportions that Ruth Wylie, in her review of the literature mentioned above, concluded that "the theories are in many ways ambiguous, incomplete, and overlapping" and, as a consequence, she organized her book "in terms of measurement and research design problems, and clusters of empirical studies rather than around the framework of any one theory" (1961, p. 3).[1] In this section, we will speak to some of those ambiguities by first examining several dimensions of the theoretical definition of self concept.

Referents of Conceptualization

In the literature of self theory, the term self concept may have at least three different referents in surprisingly similar discussions: self, concept of self, and self concept (Kehas, 1962). The differences, though subtle, are distinguishable.

The first referent, _self_, appears in discussions which argue for the necessity of some term in psychology to represent "the _coherence_, _unity_ and purposiveness . . . of mental life" (Allport, 1943, p. 451), a term that would avoid the objections that such use implies metaphysical or religious, i.e., unscientific conceptions. It is an attempt to give scientific respectability to a term previously discarded by psychology. In this use, it is often synonymous with "person" and "personality". This use is probably best seen in the writing of James (1890) and McDougall (1908) both of whom wrote before the term went into disrepute. McDougall's key construct was the "sentiment of self-regard". The writings of Allport (1943) later served to reintroduce the concept of _self_, i.e., ego, into psychology and to enhance its scientific acceptability.

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[1] Wylie further circumscribed her interest in the self-concept around "the self as the individual who is known to himself" (1961, p. 1). This implies concern with a theoretical framework, i.e., studies concerned with a particular definition of self.

The second referent, _concept of self_, is equated with specific _generalizations_ about one's self, i.e., with ideas or feelings _about_ one's self, perceptions, attitudes, evaluation. For example, Jahoda (1958) defines self concept as attitudes toward the self; Porter (1950) speaks of self-evaluative attitudes as being the central determinants of behavior; O'Hara and Tiedeman (1959) define self concept as an individual's evaluation of himself.

The third referent, _self concept_, is to "only those perceptions about self which seem most vital or important to the individual himself" (Combs & Snygg, 1959, p. 127). To the individual it represents his generalized self. It is not viewed as an entity _per se_, but represents the organization or the system of generalizations which a person has about himself. Said in another way, _self concept_ is the cluster of the most personal meanings which a person attributes to himself as an individual. Raimy views it as "organized appreciation of the self" (1943, p. 21). It is not _a_ or _the_ self concept; it is intended to represent what is seen as both an organization _and_ a system of organizing principles. The most advanced theoretical treatment of this use appears in the writings of Raimy (1943), Rogers (1959, 1951), Combs and Snygg (1959), and the more recent writings of Allport (1955, 1958, 1961).

In offering a distinction among the various referents, we do not intend to suggest that those who use a particular referent are not aware of or do not include the others, for in point of fact, most do both. Nor are the referents to be viewed as mutually exclusive. (Indeed, one reading of the descriptions should dispel that notion!) For example, Allport is associated with the third referent, but his most recent term for these data is the proprium, and his use of "central value orientations of a life" and "intentional characteristics" of a personality are further extensions of the proprium. These terms are equivalent to the self concept as defined by Snygg and Combs. With still other theorists, the terms remain undifferentiated; Rogers' latest formulations view the terms self, self concept, and self structure as being identical (1959). The point should be clear: the same language is used to represent different phenomena and, conversely, different language is used to represent the same phenomena.

What Ruth Monroe has said of the "self-psychoanalytic" theories seems to apply equally well to self psychology -- "the self theories have left the concept (of self system) too far undifferentiated, with the result that it becomes a philosophical universal instead of a developmental construct" (1955, p. 367).

Movement in Theory. The confusion surrounding the referents of the term self concept may lessen somewhat if self concept theories are considered as being a logical extension, or evolution, of self theories, i.e., a continuing refinement and elaboration of the earlier position. This evolution may well go unnoticed, however, if theorists persist in blurring the various terms as, for instance, Rogers has done, with self, self concept, and self structure (1959, p. 200). Such equating minimizes the differences among theorists and their language and may blot out some meaningful distinctions.

What is the nature of this evolution? A shift in emphasis from self to self concept suggests a redirection of efforts in self psychology from a concern with psychological entities within man, viz., selves, to a concern with persons psychologically. Contemporary theorists are in no sense concerned with a real self; they do not posit a self within a person.

The shift indicates a reorientation. The old position raises a host of metaphysical questions. The new theoretical arguments explicitly postulate that the person has concepts about himself, not a self, indeed, that the notion of self is a concept. A person has constructs about himself in much the same sense that a psychologist or any scientist has constructs about his data. A person theorizes about himself as a psychologist theorizes about his data; in both instances, the person in theorizing not only interprets past and present behavior but also shapes future behavior. In each instance, the basic processes are the same; differences between the lay person and the scientist which do exist are to be found in the level of sophistication and refinement.

Lest this evolution be viewed as more than a rediscovery, permit me to quote from Charles Hubbard Judd writing some fifty years ago:

> Among the ideas which are built up in practical life and refined by scientific study, there is one which is of special significance to the student of psychology. It is the idea which each person has of himself. So significant is this idea for our ordinary thought that it has sometimes been described in terms which imply that one knows oneself directly as though through some kind of immediate perception. . . . That the self is a being which can be directly perceived is, however, contradicted by all the facts of development. The child does not know himself until after he has had a series of experiences. Even the adult has something to learn about himself with each new turn of conscious life. The idea of self must therefore be described as a concept which matures in the course of experience, just as does any other scientific or practical idea (1917, p. 269).

Concept

In the context of self psychology, the term concept is used in a technical sense. Its meaning is inextricably embedded within the theoretical framework of self psychology, a meaning which, it might be added, is not consistent throughout psychology. A few examples should serve to make the point.

William James (1890, p. 185-187) considered thought and feeling as inextricable from each other, as aspects of a single process. He sought some general term by which to designate all states of consciousness merely as such, and apart from their particular quality or cognitive function. Raimy, in setting up his theory of the self concept, declared his first principle to be that "the self concept is a learned perceptual system which functions as an object in the perceptual field" (1943, p. 336). Realizing that some explanation was necessary for speaking of perceiving a concept, he said that in his view percept and concept are indistinguishable parts of a single process. Departing from traditional practice in laboratory psychology, Combs and Snygg (1959, p. 30), used the word perception to refer to _any_ differentiations the individual is capable of making in his perceptual field whether an objectively observable stimulus is present or not. As did Raimy, they argue that perception and conception are aspects of the same basic process which they choose to call perception.

Frenkel-Brunswik hints at the "non-reductionistic" aspects of perception, saying it is fact that "there is some element of inference in every perception, and that conceptual constructs always relate to perceptual data" (1951, p. 357). Korzybski takes an even stronger position declaring that "there is no 'perception' without interpolation and interpretation" (1951, p. 187); for Korzybski, perceiving is equivalent to evaluating _and_ to conceiving. Kelly (1955, p. 70), in advancing his psychology of personal constructs, preferred the term _construct_ to both percept and concept so that he could at the same time include the idea of its being a personal act _and_ involving abstraction. Allport (1958, p. 301), desirous of maintaining a distinction between perception and cognition, offered _proception_ as a term which subsumed them both and could preserve the unified, molar quality of experiencing.

Whereas, then, in other psychologies, the above terms are more or less sharply distinguished, there is a tradition in which the terms concept, percept, cognition, feeling, and thought are in some sense viewed as one. This difference leads to difficulties in communication between the differing theoretical frameworks and contributes to much misunderstanding.

A confusion similar to that involving the term concept also exists in the use of combination terms such as self-image, self-observation, and self-description. One way of lessening this confusion is to explore the foundations upon which these terms are based. Stated differently, the problem is one of definition and not simply of terms.

The appropriate question becomes: what is intended by "concept" in the term self-concept? Does this mean how an individual conceives of himself, observes himself? The image he has of himself? Is this merely descriptive? Does it include any and every bit of self-description or talk about self? More than an observation or description is meant; the term intends abstractions about one's self. What is involved is knowledge of one's self, but not simply knowledge in any restricted cognitive or intellectual sense. The concern is with how a person thinks about himself, but thinks in the James sense indicated above, which does not exclude feeling. The concern is with how a person gets to know himself; self concept, self percept and other such terms usually focus on the knowledge resulting from that process. This view that the basic process is that of getting to know one's self has not been explicitly stated.

In some sense, then, these combination terms represent different forms of knowledge. If we arrange these terms into some sequence that represents steps in the acquisition or the development of knowledge, however, we would then be reverting to what Kelly has called atomistic thinking (1955, p. 69-70). We would be violating the unity of perceiving-conceiving which these theorists, unlike Super (1963), start from and wish to maintain. The knowing is inherent in the experiencing or, in Kelly's terms, knowing is construing. No separate term to represent the knowings or the knowledge is considered necessary by these theorists.

The preceding considerations also speak to the charge that self concept theorists have neglected the wealth of work done in concept formation, that, for instance, to explain the development of a person's self concept, one must explain it as they would the development of any other concept. The equation of the two areas of inquiry is misleading to some extent in light of the meaning attached to the term concept by self concept theorists. The different original meanings result in different operational definitions. The point is twofold:

(1) Recognition of this special use of the term concept by self concept theorists is necessary to a fuller understanding of their position. (2) The behavior or experience that these theorists intend to represent is the process of getting to know one's self, or giving meaning to experiencing.

Self Report

The relationship between self report and self concept has been one of continuing and crucial concern in research. Some behaviorists and experimentalists in psychology have equated concern with the self report with unreliability, undependability, and subjectivity (as contrasted with objectivity) and concluded that it is unscientific, i.e., out of the realm of science. Stephenson (1953), however, argues that Watson and Skinner, among others, have been misunderstood, that what they in effect had said was that science was not then able to handle self reports as data. Stephenson sees their objections as resulting principally from an erroneous dichotomy between behavior and thought. Armed with Q-methodology -- "a set of statistical, philosophy of science, and psychological principles" -- he has asserted that psychology is now able scientifically to deal with self reports. He begins by viewing thinking as behavior and by not positing an internal as opposed to an external event *in esse*. In one sense, his starting point involves consideration of the self/other dimensions of a behavioral event.

Confusion of self report with self concept has also resulted in ambiguities and inconsistencies with self concept theory itself. As mentioned, Wylie, organizing a critical survey of the research literature pertinent to the self concept, concluded that to proceed from the standpoint of theory was impossible. She did not, however, distinguish between self report and self concept; in fact, she very often equates a description of self given by a person with that person's self concept. In delimiting her review, she merely states that:

> From one viewpoint any investigation in which S makes a report about himself, say on a personality inventory or in an interview, might be regarded as suitable for inclusion in this survey. However, we shall restrict ourselves mainly to studies which appear to have received at least some of their inspiration from self theories (1961, p. 5).

Inspiration from self theories is neither a precise nor an adequate demarcation and does not reflect awareness of some important theoretical questions involving the relationship of self report with self concept. Further, in discussing the construct validity of the instruments of the self theorists, she refers to irrelevant response determiners identified as social desirability, content areas, known identity of S, lack of rapport, instrument form, degree of restriction of S's response, set or expectation, response frequency, scoring or statistical procedures (1961, p. 27-36). These determiners are viewed as being outside the subject's phenomenal field and as interfering with its measurement by the observer. There seems to be an implicit assumption that the subject's phenomenal field is something other than the subject or the experimental situation. The measurement of self concept is seen as an attempt to isolate a single, uncontaminated variable, a search for a pure self concept, one apart from situations. It suggests concern with a real self. To the extent this is so, it indicates an unfamilarity with theory that may well have contributed to the difficulty Wylie reported in organizing her book around theoretical concerns.

Combs and Soper decry the confusion in this area, declaring that confusion of self report with self concept in research has led to confusion in thinking and in research results, making communication extremely difficult. They go on to define self report as a behavior representing "what the individual says he is" and self concept as a perception or inference made from behavior (by an observer) representing "the organization of all that the individual refers to as 'I' or 'me'," concluding that "to treat the two as synonymous is to introduce into our research a large and unknown degree of error" (1957, p. 34-36). Thus, unlike Stephenson, Combs, Soper, and Snygg clearly distinguish between perceiving or inferring and behavior, between an internal and an external event.

Combs, *et al*. (1957, 1959), conclude that it is necessary to know the degree to which self report is a reliable indicator of self concept. They propose that the degree depends on at least the following factors, which are somewhat analogous to what Wylie has termed irrelevant response determiners: clarity of the subject's awareness, adequacy of symbols for expression, social expectancy, cooperation of the subject, and freedom from threat and personal adequacy. The position of Combs, et al., is that the observer has to infer an individual's self concept from that individual's behavior.

What then is the term self report intended to convey? At least two senses may be distinguished. The first may be expressed as what the experience of the individual is or was during the event under consideration. This sense, suggestive of classical introspection and the work of Titchener, posits an internal experience which the experiencer can best describe. The second sense, a report made by the person about himself as distinguished from a report by an outside observer, seems much closer to the sense in which modern theorists are using the term.

The first sense makes the experiencer both the observer and the observed;

the second makes the experiencer only the observed. The second does not deny the reality of the first process, and moreover, wishes to make this reality the basic datum of concern. The progress of scientific considerations in this area tend to lie with the latter sense of definition (Kehas, 1962, p. 16-25).

Organization

Positing a concept of self unique to every situation posits (in one sense) no constancy of person over and across situations. In contrast, what self concept theorists wish to do is to study the experience of constancy, of "cohesiveness, unity and purpose" that seems to be characteristic of human experiencing, i.e., the relatedness of these concepts of self. This cohesiveness, this relating implies a gestalt, a patterned interrelationship of these self experiences. These considerations lead us to the question of organization, i.e., how does an individual systematize his experience?

There is a factor of centrality, of importance to the ways an individual "conceives of" himself. Self concept does not include any and all ways an individual has of seeing himself, or evaluating himself. It does not include any and all feelings about or attitudes toward self. It is not to be equated with the entirety of experience. It is viewed as neither the sum of nor the equivalent of the myriad concepts of self with individuals possess. There is a periphery-core aspect to the organization of self. Some experiences are judged by the person as involving more of "self", i.e., self experience is hierarchically organized in terms of personal relevance. For example, Combs and Snygg make this distinction with their terms, phenomenal self and self concept, the latter defined as "only those perceptions about self which seem most vital or important to the individual himself" (1959, p. 127). Indeed the core is the self concept for Combs and Snygg. Allport (suggesting that self and ego are terms which have lost their usefulness) here distinguishes among "non ego- and ego-involvement" and within the latter the "proprium" which has "intentional characteristics".[2] Rogers distinguishes between the self (incorporated experience) and the organism (unincorporated experience). Kelly (1955) distinguishes between core and peripheral constructs. Sullivan (1953) speaks of a self dynamism and sub-dynamisms within the self system. Jahoda's (1958) treatment, however, seems to miss this distinction.

The question of organization for some shifts to concerns about vacillations within a person. It leads to questions such as these: Does the concept of organization preclude, limit or otherwise impede the consideration of changes within one's self, even the momentary changes? Is the concept of organization a limiting one in consideration of the realities of one's experience? The answer to both questions is that it need not be. Implicit in the question is a sense of organization as being something fixed and complete. Organization or structure loses its fixity when viewed as simply the ordering of relationships among a complex of intertwined and interdependent factors (Korzybski, 1951). The self concept is a systematizing of one's self, the effect of which is to allow the individual "to symbolize and reduce his own vast complexity to workable and usable terms" (Combs and Snygg, p. 127). Further it need not be a question of _either_ organization _or_ disorganization, but rather _degrees_ of both organization _and_ disorganization and degrees of stability of organization.

Discussion of the importance of organization as an aspect of the specification of self concept leads back to the logical distinctions noted earlier. These logical distinctions, though fundamental, had not clearly been made in the theory of self concept. The intent of the distinctions was to contribute to the further differentiation of self theories and to the further development of the notions as research constructs. Towards that latter end, the major distinction advanced was between (1) concept of self, which was defined as the discrete generalizations about one's self which are held by the individual; and (2) self concept, defined as the organization of those generalizations, i.e., the systematizing of those judgments which a person has about himself. Essentially the argument is that different constructs are needed to designate these two basic aspects of the process of self conceptualizing, the parts and the whole. Such designation highlights the dual use of the notion of self concept as both a specific characteristic of a larger entity and as that larger entity itself.

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[2] Combs and Snygg's theory is declared to be completely phenomenologically based. The phenomenal self and the self concept are differentiations within the phenomenal field which includes and "regulates" the phenomenal non-self. Allport, on the other hand, seems to see no relationship between the "ego-involved" and the "non ego-involved"; he talks of a discontinuity between them, of the separateness of the two systems.

Discussion of organization also leads to what are probably the most significant questions in self concept research today. (1) Is the self concept unidimensional? If not, are the various dimensions identifiable? (2) Is the organization of a general nature or related to particular contexts (e.g., school, work), or contents (e.g., physical, social, emotional), or perhaps both? Of late, many researchers have raised these questions regarding the dimensionality of self concept (e.g., Akeret, 1959; Brandt, 1958; Cattell, 1965; Diggory, 1966; Kehas, 1962, 1964; Lowe, 1961; O'Hara, 1967; Shultz, 1965; Smith, 1962; Strong, 1961, 1962; Super, 1963).

Much of the research and writing in the self concept literature, however, does speak of a or the self concept, and the search is for a single measure, or in the least, a single numerical representation. The earlier and still prevailing assumption seemed to be that there was a single attitude toward self, a position which led to the naming of that attitude also as self worth, self esteem, self evaluation, self acceptance, self satisfaction, etc. What seems to have happened is that a very strong and important aspect of self concept became confused with self concept itself. Why this has taken place is a matter of speculation. Let us then speculate a bit.

The first concerted research program dealing with self concept grew out of the work of Carl Rogers and his colleagues at the University of Chicago Counseling Center. Their program of research was anchored in their counseling practices. The most pronounced "deficiency" of those who sought counseling was their feelings about themselves. As measures revealed, these counselees had extremely low evaluations of themselves in general; to the counselor (and hence, to the researcher) the dimensions of, or the contents of, this low self evaluation were not important. Whatever the particular problem was, was simply an instance of a more general, pervasive, problem -- that of self worth.

That "set" was apparently reflected in the research. Rogers had defined self concept as "an organized, fluid but consistent, conceptual pattern of the characteristics of the 'I' or the 'me' which are admissible into awareness, together with the values attached to these concepts" (1951, p. 498). In the operational translation of this definition, Butler and Haigh (1954) had the subject go through a Q-sort twice, first sorting his "self" and secondly his "ideal self". The latter sort -- ideal self -- was included to insure measurement of the "values attached to the concepts" portion of the original definition. However, Butler and Haigh then went on to view the correlation between these two sorts as a measure of self esteem. The operational measure of self concept as defined by Rogers became self esteem. The important distinction is that Rogers' definition of self concept subsumes both the personal self and the personal ideal, whereas the Butler and Haigh translation has the effect of making self concept equivalent to self report (as they speak of self concepts and ideal self concepts when referring to the Q-sorts) and, operationally, of equating self concept with self esteem.

The strength of the self esteem component of self concept had overwhelmed its other aspects and in effect moved considerations away from the content or areas of self (dimensions), away from the specificity of the experiences which had been evaluated and organized. It should, perhaps, be re-emphasized that the particular experiences were not of direct relevance within this system of psychotherapy; it was the counselee's evaluation of his experiences which had import.

That the evaluative aspect of self concept is the strongest component is not at issue; indeed, Osgood (1957) has shown that an evaluative component is basic with all meaning. However, with the evaluative aspect well-established, the next step is to identify and specify the other dimensions. As might be expected this problem has been receiving increasing attention. Kelly (1955) in advancing his theoretical psychology, distinguished between personal constructs and the personal construct system. He established a number of relevant dimensions, some specifically for individual constructs, others for the system, still others for both. A listing of some of his constructs will suggest the complexity of Kelly's formulations: level of cognitive awareness, dilation-constriction, comprehensive-incidental, superordinate-subordinate, regnancy, core-peripheral, tight-loose, abstract-concrete. Smith (1962), in the latest of a series of studies, had identified six factors: Self-Confidence, Social Worth, Corpulence, Potency, Independence, and Tension-Discomfort. In moving to make self concept theory operational, Super (1963) has also distinguished between self concepts and the self concept system. His research began with the following dimensions: for self concepts, Self Esteem, Clarity, Abstraction, Refinement, Certainty, Stability, and Realism; for self concept systems, Structure, Scope, Harmony, Flexibility, Idiosyncracy, and Regnancy. In a cross-sectional study of self-concept, Shultz (1965) selected Clarity, Regnancy, Self-Esteem, and Source (of the self concept) for study; unhappily he found the intercorrelations among these dimensions to be so high as to make their independence suspect.

It is highly probable that the next major developments regarding self concept theory will result from research on this question of dimensionality.

The examination of the second question -- what is the nature of the organization of self concept -- will take us into the next section where the ways in which self concept "operates" with respect to school achievement will be discussed.

Self Concept and Achievement in School

Somewhat surprisingly perhaps, it is well-established that there is a self-evaluative component, distinct from intelligence, socio-economic status, and the like, associated with achievement in schools. What has not been highlighted is that it is these aspects of a person's experience in schools -- specifically the ways in which he experiences teachers -- that are of utmost import for his achievement, especially when achievement is defined as grades. It is the self-in-situation notion which, though based on the self, takes into consideration the ways in which a person experiences the other, in this instance, the school. The notion of self-in-situation goes back at least to Lewin and his statement that behavior is a function of personality and situation. The significant point here is that it is the situation as experienced by the person, rather than any presumably objective or real environment which is of most consequence. To support the point, let me refer to a few studies.

In a study of adjustment to the particular role of naval officer, Nahinsky (1958) concluded that "measuring up" (self-ideal officer r) may be the more important correlate but he found also that a feeling of "fitting in" (self-typical officer r) is an important correlate of situational adjustment. There was, unfortunately, no analysis of the independence of the two measures.

Borislow (1962) studied the importance of self-evaluation as a non-intellectual factor in academic achievement. His research was based on two different approaches to self-evaluation theory: (1) that which emphasizes the contribution of many self roles or capacity evaluations and (2) that which emphasizes the relevance of a global or general self percept with no apparent attention to unique sub-roles. He measured general self, ideal self, student self, and ideal student, and distinguished between general self evaluation and student self evaluation. His findings were interpreted as lending support to the usefulness of a more specific (role or capacity) self evaluation theory.

In a study of the personal aspects of achievement, Kehas (1964) measured self, ideal self, and teacher's ideal student, all from the standpoint of the individual student. Employing a multivariate analysis, he found that the greater the experienced gap between a student's present fit (self-teacher's ideal student r, a measure of self-in-situation) and his possible or potential fit in school (ideal self-teacher's ideal student r, a measure of optimum situational congruency), the more likely he is to be underachieving. General self concept (self-ideal r) was not an important contributor in the multivariate analysis (although it was in a univariate analysis). What distinguished his groups (under- and over-achievers) was not an intra-self factor but rather the relationships a student saw existing between himself and the school.

In a comprehensive research program on motivational factors in school achievement, Farquhar (1963) developed an objective measure of academic self concept, which has proven to be the most powerful subtest in a battery of motivation measures. Farquhar identified several relatively independent and interpretable dimensions in this measure, and found that there were both common and unique factors between the sexes. This measure did discriminate between under- and over-achievement. On this Word Rating List (WRL), the student rates concepts as he thinks his teachers would in describing him as a student. The situational specificity and the frame of reference should be noted.

Finally, Brookover (1966) working out of interactionist theories, has viewed self concept as an interveing variable in the school situation. In his rather extensive program of self concept research, he has developed a measure of self concept of general academic ability and found it to be independently related to school achievement (even more so than scales measuring self concept of ability in specific subject matter areas).

The above studies should be sufficient to make the point. A student's achievement in school is related to the way in which he experiences himself in school. A somewhat simple statement, yet it should underscore the fact that both student and school -- person and situation -- are involved.

Methods of Assessment and Observation

Preliminary Discussion

> ". . . the theoretical formulations have long preceded attempts to organize the quantitative data on the stability or change of personality characteristics. . . . .
> . . . .
> This has been a difficult area to measure and one is struck by the lack of a unified view about how to measure these characteristics and the general lack of instruments which are regarded as clearly valid and useful by the workers in the field." (Bloom, 1964, p. 133)

The assessment which Bloom has made of personality research applies equally well to the area of self concept research. Add to this Wylie's "frustration" (noted above) after she examined some 300 different studies with 140 ways of measuring self concept, and one could become somewhat pessimistic about the possibilities regarding self concept research. On the other hand, the judgment that definitive research remains to be done can be viewed as challenging.

Once again, it would be neat if we could say that there are established operational definitions and established measures of self concept which are judged to be of value by researchers in this area. But we cannot and, as noted, it again is not peculiar to this area but rather, it is basically true of personality research.

Basic to the measurement question, and to this conference, is the notion of development. A brief examination of this construct is, perhaps, appropriate.

Development

The notion of development is bound up with considerations of ontology. Development will be construed quite differently in a world approached as being, as contrasted with a world approached as becoming. The process of development in a world of being would mean that a person grows into his place in a fixed, orderly sequence -- a patterned, recurring life cycle. In a world viewed as becoming, a person would be moving either towards a never-to-be-achieved final state (constant change) or even towards an achievable state, e.g., selfhood or self-actualization (progressive change).

Theorists who hold the latter view of becoming as real tend to judge others by the extent to which these people are "becoming oriented". Hence, some people are judged as not becoming; they are either un- or under-developed, i.e., arrested at a low stage of development. This view, in effect, defines people negatively by stating what they are not, and is evaluative, not just descriptive. A sharper line needs to be drawn between observing how people systematize their experience, and promulgating a particular way of systematizing experience as desirable. The question of control of human behavior arises here and must be clearly and openly confronted. To the extent that development is equated with a desired direction of change as opposed to merely change (or even change per se), it tends to blur and confound the theoretical position. For there is nothing inherent in the construct of development or growth with respect to direction. It is only when it becomes compounded with connotations of "good", "positive", "self-realizing" and "self-actualizing" that distinctions blur. Asking the question, "how did I get where I am?" need not involve asking the question, "where should I be?". The two questions represent separate considerations.

In short, the notion of development needs further attention so that it may yield a theoretical conception of the process of psychological development which will be applicable to development in any direction, i.e., to any and all development. Secondly, the creation of this less parochial conception may necessitate the withdrawal of the notion of development as an underlying condition for the understanding of how some people experience themselves. That is, the notion of development may be meaningless with people who hold certain views of reality, i.e., systems wherein all change, growth and development are viewed as illusory. Where the notion of development as an underlying condition is retained, it must be further expanded so that kinds and types of change -- irreversible, sequential, progressive -- will be clearly demarcated. Where development is defined as a higher degree of differentiation and complexity, the criteria against which "higher" is to be measured must be denoted. Getzels and Elkins (1964) have highlighted some of the problems of marking off the developmental course and distinguished among linear, level, and stage constructs.

To a great degree, the consideration of development has proceeded from the standpoint of the theorist interested in the relationship of this aspect to his theory of self concept. The theorist should not neglect, however, to consider these same aspects as they may be experienced and construed by the individual.

The empirical work on development is extremely limited both in number and quality of studies, indeed, so limited as to make any summary questionable. At best, the studies are suggestive, perhaps illustrative, but in no sense are they definitive. What there is, is either cross-sectional or involves anywhere from a few months to a year or two between measurements. The problems involved in the execution of longitudinal studies have been noted (Bloom, 1964); there are many discouraging factors in addition to time and cost. A fundamental problem of using comparable instruments with different age groups over a period of time is yet to be resolved with much success.

Methodology

Any research, of course, is conducted in a particular context. That is to say, knowledge is always circumscribed by the inquiry from which it emerged. It would seem essential then that in order to obtain the views of a particular nation, one must allow full opportunity for its people to reveal the ways in which the conceptual realm of interest has been giving meaning.

Conceptions of man vary among nations and influence, even impinge upon, the kind of selves which could develop (as philosophers have long asserted). Indeed, self as a construct of human experience, as an individual "entity", may be peculiar to Western civilization and quite foreign to Eastern peoples. The emphasis on self definition, that is, allowing opportunity for an individual to attribute meaning to his experiencing, prevalent in some societies is quite different from societies wherein the definition of self is ascribed by society, wherein self is not personally determined but rather resembles our notion of role. There is a spectrum of selves possible in any given society, a spectrum which may or may not coincide or overlap with that in any other society. Presumably these spectra would be reflected in the structure of schooling and in instructional methodologies within a given society, and thus have most immediate consequences for the kinds of selves developed through education.

The question of how personal, intricate information is to be obtained in studies of cross-national scope is most prominent. The basic issue regarding self concept measurement is whose frame of reference, that is whose way of organizing the personal experience, is to be primary -- the researcher's or the subject's. If it is to be the subject's, then group paper and pencil tests hold little promise. The use of standardized tests involves verbal translation and runs into the problem of translation-equivalence. And even where language may be the same, the generalizability of norms to a population different from that on which the norms were developed is fraught with difficulties. The use of nonverbal or visual stimuli is a possibility; however, it does not avoid the translation problem but simply changes its nature (Anderson, 1967). The difficulty is to use stimuli peculiar to the different settings but indicative of the same conceptual realm. Most importantly, perhaps, if your interest is in how the individual defines himself, then the use of standardized tests is precluded by definition. Any subject can assume the dimensions offered him by the researcher and respond within that context, but the researcher will never know if that structure is the subject's.

The general task, of course, is measurement of the same conceptual realm in two different settings. The instruments will vary in order that the same data may be obtained, vary in the sense that the researcher will allow opportunity for the phenomena as experienced (and as construed) to be revealed to him. In social science research, the beginning assumption must be that variables are peculiar to a culture. The structure and function of the instruments is the same but the stimulus content must be relevant to the culture and thus may vary.

In my judgment, two approaches seem most promising. The content analysis of semi-structured interviews, a technique which would maximize the conscious control the subject has over the organization and meaning of the data has obvious advantages (again, if the ways in which a person organizes his experience are of primary import). The training of interviewers and the general difficulties associated with content analysis of relatively free data are important considerations in the use of this method. A variation of this approach would be a set of visual stimuli peculiar to the individual society combined with an interview.

The second method, Q methodology combined with an interview, presents an appealing compromise. The inferences made about the meaning of the arrangement of these data obtained in a Q sort are, however, limited (Field, et al., 1963).

Mere ordering, without inquiring into the bases for ordering is only a first step, important and necessary but not sufficient. The Q sort represents a first order attempt to get at the personal meaning system of the individual. The reasons for the ordering, however, remain with that individual; the inferences of the investigator are based directly on the relationships among these orderings. The development of some scheme of systematic inquiry into the reasons for the orderings would advance considerably the conceptual power of this approach. Inferences based on such second order data would represent an important step toward a deepened understanding of personal meaning systems and their influence on behavior in schools.

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XIV

THE ROLE OF CONTINUING EDUCATION: IMPLICATIONS FOR ELEMENTARY AND SECONDARY EDUCATION

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Purpose and Definitions

Throughout the history of most societies, systematic socialization of adults has paralleled preparatory education for children and youth. By contrast, the overwhelming emphasis in industrialized nations during recent centuries has been on formalized and extended preparatory education. As a result, in the thinking of the typical citizen and educator during this period, education has been equated with schooling of children and youth. Within the past half century, educators have increasingly recognized the ways and extent to which other social institutions, such as church, home, and youth clubs, concurrently contribute to the systematic preparatory education of children and youth. As a result of the increasing rate of social change during this same period, programs of continuing education have been expanding rapidly to the point where in the United States the number of adults engaged part-time in continuing education approximates the number of students in the preparatory education programs of the elementary and secondary schools. Because some of the major practices of elementary and secondary schools are based on the assumption that education means preparatory education, and because in most industrialized countries an extensive and expanding network of continuing education programs now exists, it seems desirable to explore the implications of continuing education for the future development of preparatory education in the schools (Grattan, 1956).

The purpose of this essay is to describe the two interacting social systems of preparatory and continuing education, to analyze influences of continuing education on the purposes and functioning of preparatory education, and to suggest implications for preparatory education. The proposed model for accomplishing this purpose is an open systems model in which national cultural and economic characteristics are conceptualized as a community setting, within which the schools function as a super-system, the results of which influence the resources that the school receives back from the community for subsequent educational programs. In this essay, the super-system of the school contains the major characteristics of American publicly and privately financed comprehensive elementary and secondary schools with their programs of general, vocational, and college preparatory education, or their counterpart in other industrialized nations. For this essay, the school contains two interacting systems, the preparatory education division that develops and operates programs primarily for pre-adult full-time learners, and the continuing education division that develops and operates programs primarily for adult part-time learners. In practice, of course, both preparatory and continuing education in most countries occur within a variety of institutions. For instance, in the United States only 12% of continuing education programs are sponsored by the schools. Higher education institutions and the churches each sponsor 21%, community organizations 15%, business and industry 12%, proprietory schools 7%, cooperative extension service and government agencies 7%, armed forces 4%, and other agencies the remaining 2%. However, because the purpose of this essay is to explore implications of continuing education for preparatory education, for most of the analysis the continuing education function in the community will be represented by the continuing education division of the school.

For this essay, a simplified systems model is employed, consisting of four major components -- outcomes, inputs, transformation, and assessment. Outcomes are the outputs of the system in the form of individual and community benefits.

Individual benefits include occupational and general education competence. Community benefits accrue to the range of social institutions such as employers and colleges with which the individual with increased competence is subsequently associated, to community organizations to which the school may render direct service, and to other parts of the super-system of the school. The needed inputs of the system include learners, mentors (teachers, counselors, writers), administrators, support staff, subject matter (books and materials), goals, facilities and equipment, and funds. Transformation is the process by which inputs are converted into outcomes, and is sometimes referred to as throughput in systems theory. Transformation occurs through sub-systems which, although they seldom correspond to an organization chart, constitute the actual structure of the institution. The primary sub-systems include the teaching-learning transaction, program planning, community relations, institutional relations, student personnel, research and development, finance, and administration. The memory component of the system is centered in the mentors and in the subject matter materials used in the teaching-learning transaction, but memory is also diffused throughout other sub-systems as well. Assessment is the process by which feedback is communicated throughout the system to facilitate adjustment and includes attention to the results and to the process by which the results are produced. Especially for purposes of this essay, emphasis is placed on linkage that is established between the preparatory and continuing education systems, and between the school and community regarding acquisition of inputs and utilization of outcomes especially by employers and colleges.

The remainder of this essay consists of three sections -- comparison of preparatory and continuing education systems, analysis of interaction between preparatory and continuing education, and implications for preparatory education. The following section, in which preparatory and continuing education divisions are compared in systems terms, is included primarily to contrast the "domesticated" preparatory education system with the "wild" continuing education system with its less stable procedures and lower boundary maintenance. The subsequent section is designed to explore the interaction between the content and process of preparatory education, and the content and process of continuing education. The primary emphasis is on the influence of continuing education on preparatory education. The concluding section lists some implications for preparatory education as a way of suggesting alternatives for future development.

Comparison of Preparatory and Continuing Education

There are many characteristics that differentiate the "domesticated" preparatory education system from the "wild" continuing education system. From the pioneering essays of Waller (1932) to the recent essays of Wayland (1966), there have been scattered efforts by sociologists to describe the preparatory education divisions of elementary and secondary schools as social systems. Within the past few years there have been several efforts to describe continuing education divisions as social systems (Knox, 1967a, 1967b). The following summary compares major characteristics of preparatory and continuing education systems within a framework consisting of the basic components of systems theory.

Outcomes

There are two general types of outcomes of educational agencies, benefits to learners and benefits to segments of the community. Regarding benefits to the learner, the preparatory education division primarily prepares for successful entry after secondary school into occupational (vocational) or college (professional) systems. In addition, general education provides preparation for adult life roles (especially citizen role) and college (for the professionally oriented). The most influential linkage with the schools has been established by colleges and employers. The influence by colleges has been enhanced because they provide entry to prestigeful professions, and because school teachers are college graduates and embrace collegiate values. The way in which both colleges and employers have influenced the schools has been through the establishment and maintenance of relatively enduring curriculum patterns that affect a major portion of students, only some of whom will enter college or that type of occupation.

The continuing education division typically has two broad purposes, remedial and emerging. The remedial purpose is to provide an opportunity for adults without an adequate elementary or secondary education to remove this deficiency on a part-time basis. During recent decades this has been a declining function of continuing education. The emerging purpose is to provide programs for the emerging tasks of adulthood, due in part to social change, especially occupational obsolescence. These types of continuing education programs have expanded rapidly in recent years and many are unlike typical preparatory programs. The learner and his organizations influence continuing education programs more than is the case for preparatory education, with several results. Continuing education courses are more often building blocks for the learners plan (which may include courses from other agencies) than they are sequences in an institutional plan of study. Community organizations (including employers), are often co-sponsors of continuing education programs and influence the programs directly.

The second type of outcome is benefits to school system, other educational agencies, community organizations, and the total community. For preparatory education, the primary benefits accrue to the community, as former students join the adult community with higher levels of competence which is reflected in economic growth and the quality of community life. The college preparatory function of the schools influences the quality of incoming college students. Also, the knowledge and attitudes that result from preparatory education affect both the likelihood of attracting adults to the continuing education program and the performance of those who do participate. Preparatory education divisions engage in very little direct service to community organizations.

For continuing education, the benefit to the community through increased learner competence may be less per learner than for the preparatory education, due to great differences in time spent. A typical continuing education learner might participate three hours a week for six months, compared with thirty hours a week during eight months for preparatory education students. In addition, most preparatory education students complete between eight and twelve years in the schools. By contrast, in the United States, about 15% of the adult population participates in continuing education each year. However, the results of continuing education may be more immediately and directly applied by the learners to home, job, and community. Because most of continuing education is voluntary, and the greatest encouragement from the community is occupational, the emphasis of most continuing education courses is occupational. Some continuing education objectives are achieved through the provision of staff, materials, and program planning assistance to other organizations such as continuing education agencies associated with libraries, employers, government, and private health and welfare organizations. The major benefits that accrue to preparatory education include: continuing education of parents to reinforce preparatory education, increasing the vitality and relevance of preparatory education teaching through teaching contact with adults in occupations for which the younger students are preparing, greater use of facilities, and opportunities for experimentation in a setting less restricted by tradition.

Inputs

In order to achieve the foregoing outcomes, an agency must acquire some combination of eight types of inputs. The first type of input is the learners. For the preparatory division, within compulsory attendance laws, most children and youth attend some preparatory education division. For older students, the percentage declines. Although for all schools there is a great range in ability, interest, and achievement, a specific public or private school, depending on its neighborhood, contains a selective mix of students related to ability level, family encouragement of education, and personal commitment to educational goals. In addition, the continuing full-time membership of students in school affects their orientation towards each new grade level. For *continuing* education each year in the United States, about 15% of the adult population voluntarily participates, about 2% in programs sponsored by the schools (Johnstone, 1965). Ability and interest tend to be relatively high, and although variability within a division is great, in each class the participants are similar. Many are parents of preparatory education students.

The second type of input is *mentors* (teacher, counselor, writer). Most *preparatory* education mentors are full-time teachers with a limited specialized preparation, but with long school experience as student and teacher. The school hiring policy seeks to maintain a mix of specialities based on curriculum categories. The turnover rate is relatively high and departure is predominantly at the initiative of the teacher. Most *continuing* education mentors teach adults on a part-time basis in addition to a full-time job as a teacher in the preparatory education division or as a successful practitioner in the community. Their contact with the continuing education division is on an individual arrangement, and no cohesive mentor group develops.

The third type of input is *administrators*. Most *preparatory* education administrators are former teachers who became administrators through similar education and experience. There are many sources of *continuing* education administrators, although in school programs prior teaching experience is typical. In school divisions, career movement tends to alternate between preparatory and continuing education divisions, which results in twin loyalty. In part, because the administrators are the only persons who are associated full-time with the continuing education division, it is through them that specialized knowledge related to effective education for adults is transmitted.

The fourth type of input is *support staff*. For the *preparatory* division school staff other than mentors and administrators include secretarial, custodial, and business office, most of whom are full-time. For the *continuing* division most of the support staff members are full-time with the preparatory program and service the continuing education program with part of their time. This poses some problems related to selection, orientation, and accountability.

The fifth type of input is *goals*. The goals of *preparatory* education become formalized as policy by the school board. Most policies are reactions by the board to various sources of goals, such as statutes, state education department regulations, teachers, administrators, professional associations (including teachers unions), accrediting associations, community pressure groups, and students. Some of the proposed goals are in opposition to each other. The role of the superintendent and the board is to accommodate them as much as possible, using excellent preparatory education as the major criterion. The goals of the *continuing* education division are also derived from a similar variety of sources, but there are major differences in emphasis and process. The little attention which the school board devotes to the continuing education division, relates primarily to receipt of state and federal aid. The participants influence the course offering in a major way, because most courses must achieve at least a minimum enrollment to operate. In addition, many divisions have community advisory groups. The mentors in the division tend to have little direct influence on goals, but because of shared mentors, facilities, and support staff, the preparatory division tends to have a major influence on continuing education policies.

The sixth type of input is *content*. For *preparatory* education the selection of course content, instructional materials and library holdings tends to be influenced slowly by elaborate procedures involving the state education department, textbook publishers, and faculty curriculum committees. The organization of content is based primarily on the logical structure of the subject matter field. For *continuing* education the teachers and learners working on a single course, mainly influence the selection of content, which tends to be organized around problem areas, with information from several subject matter areas.

The seventh type of input is *facilities and equipment*. Typically the *preparatory* education division of the school owns all of the facilities and equipment used by the preparatory program, and its acquisition and maintenance is a major aspect of administrative effort. The *continuing* education division tends to have exclusive use of almost no facilities and equipment, but shares what it does use with both the preparatory program and with other organizations in the community.

The eighth type of input is *funds*. For the *preparatory* division of the public schools, almost all income comes from taxes. In the United States the percentage of private schools that have *continuing* education programs is very small, compared with the public schools. In the public schools, the adult learners typically pay directly a share of the costs.

Transformation

To produce the desired outcomes, the inputs must be transformed in some way. The eight major types of transformation constitute sub-systems of the agency. One type of transformation is the *teaching-learning transaction*. In *preparatory* education, the predominant instructional setting is the continuing group that is similar to both the temporary group setting and the organizational setting in continuing education. For most of the day in elementary education and for each course in secondary education, one teacher works with about thirty learners. The student sub-culture tends to be cohesive and powerful, and is the focus of most teacher classroom management concerns. The learners' classroom experience is supplemented by homework. The teacher assumes the primary role in deciding what will be learned and how it will be learned. The primary focus is on transferring organized bodies of knowledge and skills that are in books or in the teacher's head, to the head of the learner. Continuing education programs tend to utilize all four educational settings -- individual, temporary group, organizational, and community. The individual and temporary group settings together are similar to the homework and classroom pattern of preparatory education. The organizational and community settings emphasize direct linkage between continuing education and the ongoing role relationships of adulthood, such as employing organization and voluntary association, in which the adult learner may apply his increased competence. It is in these settings that the differences between preparatory and continuing education are the greatest. Continuing education in the organizational setting takes into account the dynamics of the social system within which the adults had interacted together prior to the educational program and will continue to interact afterwards, as a basis for facilitating application of what is learned. The community setting is similar, except that the focus is on interrelationships between differing organizations in a neighborhood or community. In both of these settings, and to a lesser extent in the typical temporary group setting, the content includes not only organized subject matter fields but also the experience and interaction patterns of the adult learners themselves. As a result there tends to be a special emphasis on methods such as discussion, sensitivity training, role playing, and field trips that facilitate transfer to the adult life situation. Although there tends to be a higher degree of group cohesiveness in continuing education classes than is the case for many preparatory

education classes, the part-time and transitory nature of the learners in the entire division restricts the development of an influential sub-culture of learners within the division.

A second type of transformation is program planning. The planning of the preparatory education curriculum for a school involves many groups of professionals and becomes highly standardized. Within the resulting framework, the individual classroom teacher has great latitude to make specific curricular decisions with little participation by administrator, colleague, or student. Much institutional effort is devoted to problems of scope and sequence of subjects as a way providing for orderly student progress, reducing variability at lower levels, and integration of the contributions of specialized staff members. Each course is characterized by generality to preserve flexibility for students who have little idea how they will apply concepts in adulthood, but with some specificity to achieve relevance. In continuing education with the exception of a limited amount of remedial education, there is little division-wide planning of an over-all curricular framework. The major influence on what is offered is the requests and response of adults in the community. In the more effective divisions, the administrators perform an educational leadership role in assessing community needs and in projecting courses that appear to be important. For courses, with more than one mentor the program administrator typically performs a major planning function. There are four types of courses, those that have the same objectives and methods as for preparatory education, those that have substantially different objectives and methods, those that seek to attain the same objectives but employ methods that are more appropriate for adults, and those that use the same content and methods but employ the courses as building blocks to achieve other objectives.

A third type of transformation is community relations. In preparatory

education, the primary focus of the community relations efforts is on achieving a high level of generalized community understanding of the school program as a basis for approval of annual budgets and bond issues. There is also some effort to be receptive to major community pressures that seem to be compatible with professional objectives. Because attendance of all children is compulsory, the community relations efforts aimed at children and youth are not designed to attract them initially but to increase holding power during late adolescence. As a domesticated agency, the preparatory division must accept learners who must attend. There is typically little competition between schools, financial decisions are not directly related to learner satisfaction, the division faces the problem of unselected and sometimes unmotivated students, and there is high internal resistance to change. In continuing education the primary focus of the community relations efforts is on encouraging adults to participate. Part of the effort is aimed at adults as individuals, but another part involves establishing systematic linkage between the continuing education division and the organizations in the community with which the adults in the target population are associated. Most divisions can attract a moderate sized middle class population with little difficulty, but to reach many working class adults typically requires elaborate and continuing efforts. Additional aspects of community relations include the identification and recruitment of teachers from the community, appraisal of educational needs, and program interpretation. The wild division with high tuition and admission requirements depends on the mutuality of admission requirements and demand of qualified learners to participate. These divisions are typically dependent on learner's fees and satisfaction, there tends to be competition with other adult education agencies, and they tend to be adaptive to the environment. In the public school adult education division that accepts all enrollees and derives little or no income from tuition, the client may elect but the agency must accept. Rapid increases in enrollment are typically undesirable for this type of division because of the severe financial problems that result.

A fourth type of transformation is institutional relations. For the preparatory education division, institutional relations consist primarily of the internal personnel function including fringe benefits, record keeping, and modest supervision. Individual teachers tend to be quite isolated from other teachers, there is limited supervision, and records such as course plans are used to achieve greater uniformity and predictability. By contrast, institutional relations for the continuing education division is primarily concerned with relationships with the preparatory education division, because it is the major source of staff and facilities.

A fifth type of transformation is student personnel. The student personnel function of preparatory education concentrates on record keeping to facilitate accounting of attendance for state aid and to facilitate ranking of relative performance, and on guidance through curricular paths and into job or college. In continuing education the student personnel function tends to be underdeveloped, but where it does extend beyond advising at registration time, it concentrates on counseling with adults regarding the development of their long range plan of continuing education. There is little emphasis on record keeping or placement.

A sixth type of transformation is research and development. In most preparatory education divisions, research and development consists of encouraging professional staff to take more courses, and to work on committees for curriculum change, as ways to facilitate adaptation. In the continuing education program, a major means of adaptation is to focus on different content or different segments of the adult population and accordingly to select a different mix of mentors. There tends to be very little research or personnel development.

A seventh type of transformation deals with finance. The flow of funds within the public preparatory education division is primarily the receipt of tax funds from the community (directly through a tax levy or indirectly through governmental units), and the use of funds to acquire personnel and physical facilities which in turn help to produce the results. Unlike the private preparatory education division, where the parents of the learners pay tuition directly and place funds back into the cycle to pay for personnel and facilities, the public school must convey to the voters and decision makers in the district the benefits of schooling to student and community. The typical public school continuing education division shares characteristics of both public and private schools. Through the fees that they pay, the learners are similar to the parents of the private school students in expressing satisfaction directly through continued patronage, so that the financial transformation cycle tends to be partially complete. However, in the United States, both local and state government (which also dispenses federal funds) contribute part of the financial resources and thus tend to influence the resulting program. A major problem for the continuing education division is limited influence on school decision makers who are primarily oriented towards the preparatory program.

An eighth type of transformation is administration. The preparatory education administrative staff constitute an organizational layer that has limited contact with both the teaching staff and the school board. The organization structure of the preparatory division is typically well established with stable and visible boundaries. Students, teachers, parents, and board members each have relatively well defined roles to perform and there are many and firm, although sometimes conflicting, expectations of the role of the administrator. The continuing education administrator operates within a very different organizational setting. The continuing education division is far less institutionalized. There are no laws that require attendance, no full-time teachers on tenure, no standardized curriculum in which many groups have a stake, no almost automatic flow of funds, no separate policy board engaged in establishing policies to help assure stability and survival. The lack of visibility and independence deters the development of stable patterns of functioning. Often, as the only full-time staff associated with the division, the administrators must continually work to define sociological boundaries and to achieve stability and continuity. This requires constant and close working relationships with both mentors and community groups. Few of the needed resources are acquired automatically but require continuing administrative effort. One by-product of this lack of organizational stability is the great flexibility that is available for innovation and rapid response to community requests, without the constraints that are characteristic of more stable organizations. Under the circumstances, however, the administrator must emphasize the importance of voluntary cooperation if he is to be able to respond to requests.

Assessment

The process of assessment provides a way for the agency to evaluate the extent to which its intended outcomes are being achieved and the effectiveness of various parts of the process. Regarding results much emphasis in preparatory education is on ranking students by assignment of course grades. Because the criterion is mastery of subject matter and because many similar students have taken the same tests for the same reason, there are established standards of comparison. The grades are used to decide success or failure during schooling and entry into jobs and college. A part of the testing is state and national. In continuing education there is little emphasis on assessing the relative educational performance of participants, so little in fact that it is exceedingly difficult to obtain a criterion for making judgments regarding effectiveness. Because of the difficulty in assessment of application, there has been a tendency to shift the responsibility for assessment to the learner. Evaluation practices tend therefore to emphasize periodic feedback to the learner regarding his learning performance, summary of learner opinions regarding the benefits of the course, and assessment of application of learning outcomes within the context of home, work, or community life.

Regarding the process of preparatory education, in recent years there have been some efforts to assess the effectiveness of the process of learning and teaching, as is illustrated by methods research. In continuing education, most of the scattered systematic evaluation efforts have been program evaluation, in which the purpose is not so much to judge the learners as to identify ways in which to improve the educational program. The program evaluation process has stressed the comparison of evidence regarding resources, transactions, and results against descriptive information regarding similar programs, to facilitate judgments about program effectiveness.

Interaction between Preparatory and Continuing Education

The foregoing section presented a descriptive comparison between preparatory and continuing education divisions to identify similarities and differences. This comparison provides a basis for an analysis of the major ways in which one division does or may influence the other. Within the context of this essay, the primary emphasis is on the present and potential influence of the continuing education division on the preparatory education division. However, in a specific school the preparatory and continuing education divisions interact and influence each other. As a result over the years the influence of continuing on preparatory education would depend in part on the previous influence of preparatory on continuing education. Therefore, before presenting an analysis of continuing education influences on preparatory education, there is an analysis of preparatory education influences on continuing education.

Influence of Preparatory on Continuing Education

In this analysis, a distinction is made between content and process. Content refers to educational objectives in the form of intended knowledge, skill, and attitudes which the learners should possess at the conclusion of the program if it is maximally successful. There are major value judgments implicit in the selection of the subject matter and behavioral change that is to be included in the educational program. Process refers to methods and procedures by which learners acquire the intended content, and by which educators seek to assist them. The direction of influence between preparatory and continuing education, in combination with the distinction between content and process, results in the sub-division of this section according to the influence of preparatory education on the content and then on the process of continuing education, and the influence of continuing education on the content and process of preparatory education.

Content. There are three major influences of preparatory education on the content of continuing education. The main influence occurs through the competence of the continuing education participant. The results of preparatory education can be defined according to the distribution of the adult population by level of formal preparatory education. The desirability of a given distribution of educational level in a community or nation depends upon the assumption that is made regarding an optimum distribution to serve economic, social, and political goals. Although a few nations have overproduced at certain educational levels (in terms of the capacity of the economic system to utilize trained manpower), in most industrialized nations the further educational development of manpower at all levels is a major and continuing objective.

Within each level of completed preparatory education, the results of preparatory education can also be defined according to the excellence of the preparatory education that was received. There are several relevant indices of excellence such as achievement test scores, occupational productivity, social responsibility, political wisdom, and continuing intellectual growth. The latter index is of special relevance to continuing education with its function of assisting adults who volunteer to educationally increase their knowledge and skills. Two results of preparatory education which contribute to continuing intellectual growth are competence level and attitudes towards education.

Unfortunately, direct evidence regarding the extent to which preparatory education facilitates or inhibits continuing intellectual growth during adulthood is not available, but there are several studies that allow relevant inferences. The findings by Johnstone (1965) showed that in the United States, with each additional year of preparatory education the percentage of adults who participated in continuing education during the previous year increased. Nine percent of the adults who left school after eighth grade participated in continuing education, compared with 22% of those who graduated from high school, 38% of the college graduates, and 47% of those who had completed one or more years beyond college. However, London (1963) has shown that the attitudes towards school of men with less formal education are very negative and constitute part of the reason for lower rates of participation in continuing education. Of course, there are other factors such as intelligence and occupational demands that tend to encourage adults with more preparatory education to participate in continuing education to a much greater extent than adults with less preparatory education.

It appears that increasing amounts of preparatory education encourages more participation in continuing education, but that the negative attitudes towards schooling by those who drop out sooner from preparatory restrict somewhat their subsequent voluntary participation in continuing education. One unfortunate result is that, contrary to its intent, continuing education in the United States is serving to increase the gap between the "haves" and the "have nots", even though it is serving to raise the educational level of all. However, with the rapidly rising level of formal education of American adults, as older adults (who typically have substantially less preparatory education than the middle aged) die, and as young adults receive substantially more years of preparatory education than their parents, the extent of participation in continuing education is expected to increase dramatically and the content of continuing education will certainly reflect this change in the clientele. A half century ago when grade level at school leaving was substantially lower, when economic and social circumstances forced able students to leave school before they wanted to, and when there was a high rate of in-migration, a major portion of continuing education was a remedial attempt to replace a portion of preparatory education that was missed earlier. Today, remedial education is an exceedingly minor part of continuing education and the continuing education participant tends to have more preparatory education than his circle of friends, not less. An additional influence of preparatory education on the content of continuing education is reflected in the continuing education courses that adults select. Johnstone (1965) has shown that 32% of continuing education courses are occupational, and 19% are related to use of leisure, compared with 3% on public affairs and current events.

A second major influence of preparatory education on the content of continuing education is the availability of learning resources. The main resource that the director of the continuing education division has to offer the adult community is the knowledge and instructional competence of the library materials and teachers in the school. In addition, there are supplementary materials and resource persons who are available to him in part because his program is school sponsored. Some successful practitioners from the community will teach a course through the continuing education division of the school, because of their commitment to the institution, who would not do so under other arrangements. A related factor is the competence of the director. The commitment of the school to continuing education is reflected in the incentives that are allocated to attract a highly competent administrator of the continuing education division. If this position is part-time and must be filled by someone already in the preparatory education division, the selection of the director is further affected by the talent pool within the preparatory education division. A highly competent director of the continuing education division would be expected to utilize the learning resources of the preparatory education division in a way that is most effective in relation to continuing education objectives and most satisfactory for the preparatory education division. The richness of the learning resources within the preparatory education division in relation to continuing education objectives, affects the extent to which the director must obtain additional learning resources from the community.

A third major influence of preparatory education on the content of continuing education is the curriculum of preparatory education. For that portion of the continuing education program that aims to provide an opportunity for out-of-school youth and young adults to complete their preparatory education on a part-time basis, there are major pressures to proceed in a way that parallels the corresponding preparatory program. In this instance the excellence of the preparatory program would influence the continuing program directly. For the remainder of the continuing education program, the content and process of the preparatory program provides a starting point for the development of continuing education courses, especially as an experienced preparatory education teacher plans to teach his initial continuing education course. If there is a preparatory education course with the same objective as a proposed continuing education course, and if the methods are highly effective, then a successful continuing education course can result with little modification or effort by the continuing education program administrators. Aside from methods effectiveness, a primary factor in the applicability of preparatory education courses to the continuing education program is the extent to which the principle of preparatory course organization is the listing of information. As the organization principle moves towards the structure of knowledge, the applicability to continuing education increases somewhat. The most direct applicability occurs when the focus is on the interaction between the structure of knowledge and the problem settings in which the knowledge will be utilized.

Process. There are three major influences of preparatory education on the process of continuing education. The main influence of preparatory education on the process of continuing education is the habit patterns of former preparatory education students and of current preparatory education teachers, regarding the teaching-learning transaction. The dominant pattern of an informed teacher, informing a group of uninformed learners in a classroom setting, is so wide-spread that other approaches must be introduced through great effort if they are to become established. To the extent to which the emphasis in preparatory education is on inquiry, the active role of the learner in shaping and evaluating his own plan of study, and on the utilization of an appropriate variety of learning settings, the continuity with effective continuing education is facilitated. London (1963) has shown the ways in which miseducation during childhood regarding the process of education makes re-education necessary during adulthood.

A second major influence of preparatory education on the process of continuing education is the typical approach to program development. The typical pattern in which the teacher has almost sole responsibility for planning a course within a set of guidelines from a relatively rigid curricular plan, often presents a hurdle to be overcome in continuing education development. The preparatory education pattern provides one source of resistance to a continuing education emphasis on the learner's plan of study, and to the participation of several teachers, a program administrator, and the learners in the program planning process. This continuing education emphasis is facilitated by such preparatory education practices as team teaching and student participation in course planning.

A third major influence of preparatory education on the process of continuing education relates to the *administration of continuing education*. Clark (1956) has demonstrated that in the California public schools the perception by many preparatory education administrators of continuing education as a competitor for scarce school funds that could be better spend on preparatory education, contributed to an enrollment economy in continuing education in which numbers of adults served became the over-riding criteria of success. In the higher education institutions, Carey (1963) has shown how the continuing education division tends to move over the years from dependence to independence to collaboration. There is reason to believe that there is a similar pattern of institutional chnge that occurs in the schools.

Influence of Continuing on Preparatory Education

Content. There are a variety of major influences of continuing eduation on the content of preparatory education. The very existence of a wide rang of continuing education programs in a community should serve to reduce the "If they don't get it now, they'll never get it" pressure that has contributed to the content coverage emphasis of preparatory education. As a result, *prepartory education can be more selective* and can emphasize content that is of greter relevance to adolescence and young adulthood.

The existence of continuing education facilitates a preparatory edution curriculum model in which *the relative emphasis on general and occupational education would differ* from the current pattern, which tends to be a coninuing shift from an exclusive emphasis on general education at the beginning of elementary school to an almost exclusive emphasis on occupational education just prior to school leaving. In a differing pattern, the relative emphasis on occupational education would shift from slight in early adolescence to overwhelming during late adolescence and early young adulthood to slight after middle age through continuing education. Furthermore, the content of occupational education during adolescence would emphasize general principles and knowledge related to clusters of occupations that would be less subject to obsolescence, and in continuing education during adulthood would emphasize direct application to specific work situations. The content of general education during childhood would emphasize cultural heritage, skills and attitudes. During adolescence, general education would emphasize a variety of adult life roles including the provision of a basis for occupational selection and for the development of specific occupational knowledge and skills. During early young adulthood, general education would emphasize the interweaving of occupational and other domains of life; and during the remainder of adulthood, general education would increasingly emphasize life roles other than occupational and topics that require adult experience to understand.

The contact with adult learners by preparatory education teachers can contribute in several ways to the vitality and relevance of their preparatory education teaching. One way is to keep up to date on the content related to interests of adults. The existence of relevant interests provides illustrations. The lack of relevant interests suggests the need for a reorientation of preparatory education. Especially for teachers in applied fields, continuing education teaching experience can increase their familiarity with new relevant content. It is recognized, of course, that over-emphasis on current topics can occur.

The range and depth of content that a preparatory education division can offer in its curriculum depends on the competence of its teachers. If the desired curricular offerings extend beyond current teaching competence, and if the school is not able to recruit personnel so as to achieve curricular objectives, then one alternative is the utilization of continuing education (in-service training) with the existing teachers as a way of increasing their competence to deal with the new or additional content.

The content of preparatory education depends in part on the level of understanding of preparatory education by the adult community. With social change and educational change, the recollections by adults of their own preparatory education sometimes serve to obstruct rather than to facilitate educational progress. The image of current educational programs that is obtained through contact with their school-age children or a parent-teacher organization tends to be superficial and fragmentary. Contact by adults in a community with an effective continuing education program of the school can serve to develop a more accurate understanding of the objectives and procedures of the total school program. If the preparatory and continuing education programs are excellent, this contact should increase community support for further progress. In any event, the educational contact with the schools should facilitate retention of that which is most effective and an improvement of the remainder.

Process. The major influences of continuing education on the process of preparatory education include adding new methods, encouraging joint planning, providing for part-time preparatory education, and building community support. A major influence of continuing education on the process of preparatory education is to broaden the repertoire of teaching methods used in preparatory education. A preparatory education teacher who teaches continuing education courses in which a premium is placed on the teacher stimulating interest and demonstrating relevance, is given both a reason for broadening his repertoire of teaching methods and the opportunity to experiment. This is especially so for methods that emphasize a problem orientation, discussion, attitude change, analysis, application, and skills of inquiry.

Experience with the *planning* of continuing education courses can encourage the preparatory education teacher to include additional persons in the process by which his preparatory education courses are planned. This applies especially to students, other teachers, and adults from the community.

The assumption underlying most preparatory education is that it must be continuous(with the exception of vacations) and full-time. The experience of the continuing education division with part-time programs can encourage preparatory education divisions to develop programs for adolescents and young adults who would attend on a part-time basis. This would allow the preparatory education division to serve youth whose educational objectives are similar to the full-time students, but for whom family, occupational, financial, ability, or attitudinal problems restrict full-time participation. This would be especially beneficial for many lower-class youth for whom a combined work-study plan has many advantages.

Part of the process of preparatory education, especially from the standpoint of school board and superintendent, is the development and maintenance of *community support* for the total school program. As was indicated earlier, an effective program of continuing education can contribute to this process. However, this will occur in the long run only to the extent that the focus of the continuing education is on quality education and not on public relations.

Implications for Preparatory Education

The following statements are assertions regarding ways in which prepastory education might be improved, based on practice and research in continuing education. The supporting evidence for each assertion is, however, limited so that each statement should be thought of as an hypothesis to be tested by reseach and demonstration.

1. If the learner is to have optimal interest and achievement, then:
    - A. He must participate in the program planning process so that there will be high congruence between learner and teacher objectives;
    - B. The learning experiences must encourage inquiry and a search for meaning; and
    - C. An individualized counseling function will be required.
2. If the learner is to have optimal achievement and application, then:
    - A. The program focus must be on the interaction between
        - 1) Problem areas that have specific and immediate relevance to the learner, and
        - 2) Organized subject matter areas, and
    - B. There must be a balance between
        - 1) General education and generalized occupational education (that is resistant to obsolescence), and
        - 2) Depth experience in selected practical and applied areas (to facilitate motivation and application).
3. If the teacher is to provide an optimal learning environment, then:
    - A. He must have procedures for evolving and communicating clear and compelling objectives, and
    - B. He must have a broad repertoire of teaching methods from which he can select those that are most effective, such as those that provide for:
        - 1) Part-time participation by the learner,
        - 2) Utilization of individual, temporary group, and organizational settings,
        - 3) Team planning and teaching, and
        - 4) Utilization of part-time teachers and facilities from the community.

4. If the community is to provide optimal support for preparatory education, then:
    - A. Educators must take the initiative in establishing a variety of procedures whereby the school can maintain constructive contact with many segments of the community, and
    - B. Special emphasis should be placed on contacts that deal with essential ingredients of education.

For each of these assertions, there are some instances of illustrative professional practice in secondary education. The conclusion of this essay is that preparatory education programs with these characteristics should be more widespread.

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XV

LIFELONG LEARNING IN THE "EDUCATIVE SOCIETY"

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In the following, theoretical considerations will be given to the subject of continuing education in modern industrialized and rapidly changing society. My thesis is that educational planning in modern society must take lifelong learning as a basic assumption.

Before I proceed to develop this thesis and analyze its consequences for the school system and for in-plant training programs, I shall outline the conventional view of formal education and its relation to the vocational career. This view, at least as it has prevailed in Europe, may be described in schematic terms as follows: From their childhood and up to their teens, young people are supposed to receive the general education and vocational training they need to qualify them for two roles, as citizens of their community and as participants in the labor force. The relatively few that stay in school to the age of 20 provide recruits for an even smaller elite group who will spend several more years at the university, where they are trained for the professions and positions of high status in the job world. By the time most people are about to conclude their schooling, they are supposed to have either made their vocational choice or to have been helped to make this choice. Whether young people enter the job world before they are 20 or several years afterwards, the majority of them are assumed to remain faithful to the occupation or at least to the occupational area in which they started, in spite of actual changes of employment.

Selective Migration and Occupational Mobility

This picture is based on the experience of a static society, where geographic mobility was relatively slight, and social and occupational mobility even slighter. It certainly does not apply to today's dynamic society. Assuming that present tendencies hold, only a small minority of young people will be in the same occupations after 20 as in the first few years after leaving school. This observation is corroborated by several studies; one of these studies, by Neymark (1961) will be cited in greater detail.

The industrialization of society originated mostly in urban areas and in turn gave rise to more urban areas. A main driving force for this expansion of the economy was the influx of manpower from rural areas to the cities and towns. The flight from the countryside was chiefly a flight from the farms, whose share of the gainfully employed population has accordingly dwindled in all countries with expanding economies. In the United States, between six and seven percent of the labor force is now adequate to produce more than enough food for the rest of the country. The corresponding proportion in France is over 15%, and in Sweden somewhere in between.

This massive depopulation of the countryside in the past century is a universally known fact. Most of the people who now live in cities had ancestors who tilled the soil only a couple of generations ago. But how are we to interpret the rural-to-urban migration in purely quantitative terms? Has it had the same impact on all levels of qualification, whether these are of a personal or educational nature? Or is some form of selective migration (Husén, 1948) at work? As far as Sweden is concerned, we still have very little information to go on. All the investigations made by economists or ethnographers have applied to limited regions. One example is Wallander's (1948) interesting and valuable study, "Flight from the Backwoods" (Flykten fran skogsbygden). The dynamics of an industrial society is generated not only by people when they move from one place to another, but also when they embark upon new occupations, take new employment, and change their social status. Only in exceptional cases do young people nowadays choose their parents' occupations. Technological advance continually creates new occupations and phases out others. In the educative society, climbing up the social ladder depends very much on the opportunity and ability to climb up the educational ladder.

Our knowledge of how these different types of mobility operate in Sweden has been greatly increased by the Neymark study. In 1948 Neymark selected a random 10% sample of male youths and followed their careers for a period of eight years. He also retrospectively mapped their careers from 1942.

The principal aim of the study was to elucidate the mechanisms of the vocational-selection process. This process is evidently linked with large-scale migration, at the same time that the education, ability and social origin of the young people may be expected to govern both migratory and vocation-searching tendencies in various ways.

From the records on file at the Central Conscript Bureau of the Swedish Armed Forces a 10% sample numbering 4,500 young men was drawn who were born in 1928 and were called up for induction to military service in 1948. The files included particulars on education, school reports, test scores, and medical condition. This information was supplemented by the responses to two questionnaires, the one sent out when the young men were 21 years of age and the other when they were 28, in which they were asked to state their communities of legal residence in specified years, as well as their general and vocational training, elementary school grades and employment status.

The place of residence was ascertained for 1942, 1949, and 1956 and, according to the responses given, Neymark could divide his sample into different categories of stay-at-homes and migrants, depending on the types of community and the distances involved in the migrations over the 14 years under investigation. After calculating net migration losses and gains for different regions, agglomeration levels and other quantitative measures, Neymark then tackled the central problem: How much selective migration is there? In other words, to what extent are the quantitative changes linked to qualitative changes? He demonstrated that rural-to-urban migration is positively correlated with education, ability (as assessed by school marks and test scores) and social class. The highest order of correlation appeared to be with general education. The higher a young man's educational attainments, the more likely he is to move to the cities and towns. The longer his formal schooling, the more usual it will be for him to move farther from home, in this case from a rural area into one of the cities. No less than 75% of the rural youths who had taken some form of pre-university education left home for the cities, as compared with only 25% of those who did not go beyond elementary school. In terms of ability, too, the rural migration losses were greatest at the highest levels. Thus 57% of those with the highest scores in the achievement test left home as compared with only 14% having the lowest scores. Special attention was given to those who, according to test scores and psychiatric examination, were mentally retarded. Within this category only 17% moved to the cities and towns as against 38% of rural youths of normal intelligence. The gifted sons of farmers are more inclined to move to the towns than the gifted sons of rural working-class fathers in non-farm occupations. Thus, the migration tendency among farmers' sons was two-and-a-half times greater for the most able than for the least able 25% in this group; the corresponding ratio in the rural non-farm group was 1.6 to 1. On the other hand, sons of working-class fathers in the countryside showed a stronger general tendency to migrate than farmers' sons, 40% as compared with 25%.

However, the fact that rural areas have yielded a positive selection of migrants in terms of ability and general education did not raise the urban mean during the period from 1942 to 1956. The original difference in mean between town and country was so great that the inflow has actually slightly lowered the urban mean.

A question that Neymark touched on only incidentally, but which is more relevant for our present purposes, is this: Does the process of out-migration represent a more fundamental drain on rural resources? In other words: Is a loss of inherited ability also involved? If the measures of ability are taken to reflect mainly hereditary differences between individuals, it would take no more than two generations for the countryside to lose virtually all its superior talent. But we know that though rural-to-urban migration in Sweden as in the other industrialized European countries has been going on intensively for generations, the institutions of higher learning are experiencing a rapid increase in the proportion of rural students. Further, the correlation between social background and formal education is very high for rural areas. By way of example, 90% of the sons of salaried employees have completed at least lower secondary academic schooling (up to grade 10 or 11), as compared with only 5% of the farmers' sons and between six and 18% of the rural working-class sons. This suggests that much of the selectivity operative in migration from country to town is social and educational. The migrants are made up not only of those having higher educational attainment and test scores, but also of young people who come from homes where greater store is set by educational and career ambitions.

Social Mobility

In their book, Social Mobility in Industrial Society, Lipset and Bendix (1959) demonstrated that social mobility increases with growing urbanization. The more urbanized the environment in which a person grows up, the greater the probability of his reaching a higher occupational status than his parents. But urbanization is an integral part of industrialization. Accordingly, we can expect a much higher degree of social and occupational mobility in the cities than in the towns, which in turn are higher on both counts than the villages. In the second part of his book Neymark subjects both occupational and social mobility to exhaustive analysis. He found that no less than 42% of the young men in his sample changed occupations between the ages of 20 and 28. Only one-third had remained in their starting occupations (at age 20). In the intervening period the rural non-farm trades had lost one-third of their practitioners, while agriculture lost an even greater share. The differences in occupational shifts between the stay-at-homes and the rural-to-urban migrants were not as large as could be expected, considering that such shifts often entail a geographic move.

The element of social mobility in occupational choice was considerable both in town and country. Only 6% of the urban youths and 11% of the rural youths in the sample pursued the same occupations as their fathers. When these proportions were adjusted to make allowance for similar or allied occupations, Neymark estimated that one-sixth of the urban youths and one-tenth of the rural youths ended up in their fathers' occupations. This means that only a very small minority received any kind of vocational training or guidance in the home.

Even though the 1950's were a boom period which gave rise to great mobility, especially among young people of the generation considered in Neymark's study, this fact illustrates that occupational mobility and the relative independence of vocational choice from social origin are rather typical of the industrialized, educative society. An expanding economy, with its ever-increasing and insatiable demand for well-trained manpower, will further accelerate not only geographic but also social mobility. We must also in this connection consider what I should like to call "adjustment mobility", flexible adaptation to new requirements in adulthood. This need means that the educational system cannot afford to make too early commitments to specific occupations. By the time many of today's school leavers reach middle age, they will be performing jobs which simply do not exist at the present time. It will probably become normal in the future for the gainfully employed to take retraining not only once, but several times, during the course of their working careers. Obviously, the need to retrain will become most urgent for those whose current usefulness to the labor market derives from fairly specific skills. As for personnel with a broad background of general education, augmented by skills of the kind that can cover a wider gamut of working situations, the problem of retraining largely boils down to provision for further education.

Consequences of the Knowledge Explosion

The dynamics of this process, whose consequences for the job world we have briefly sketched, are certainly no less dramatic when we consider what is regarded as the principal investment factor in an educative society: knowledge and skills. An important condition for the swift rise in productivity and living standards during the postwar years has been the advent of new technologies based on increased knowledge, which in turn ultimately derive from the work of research and development. In many fields, especially in the physical and social sciences, the increment of new knowledge has been so great that we can rightly speak of a knowledge explosion. An attempt to quantify the force of this explosion in chemistry was made a couple of years ago by a Swedish chemist, who based his estimate on the number of scientific publications appearing since the time of the Swedish chemist, Jöns Jakob Berzelius (who died in 1848). If I remember correctly, he arrived at a "fission period" of seven years for the number of scientific publications in chemistry. This means that the volume of research in this field will soon have multiplied eight times since 1945 alone.

The consequences of the knowledge explosion hardly need further elaboration. It should suffice to point out that much of what we learned when we went to school is becoming obsolete. The ravages are wreaked not only by time alone, but also by the head-long surge of science and technology as it affects our everyday lives. I shall consider the consequences of this development below.

Skill Versus Content Subjects

In a collection of essays entitled "The School in a Changing Society" (Skolan i ett föränderligt samhalle) in 1961 I sought to explain the impact of change on school curriculum. The impact may be expressed in terms of two practical theses. First, today's school must put far greater emphasis on the skills or tool subjects necessary in order to study other subjects successfully, as opposed to the content subjects, in which acquisition of a fixed quantum of information is the chief aim. For instance, the ability to communicate with other people in one's own or in a foreign language is increasingly essential in an internationalized world. Fewer and fewer people will be working in jobs consisting mostly of routine duties; instead, a growing number will move into the service occupations, which put a premium on ability to deal with other people. The ability to find the information one needs and to learn on one's own will gain in importance as previously acquired knowledge of specific subject matter rapidly becomes obsolete. Today's school must instill in its pupils a vivid awareness that the intellectual fare they receive will not last them for the rest of their mortal days; in short, they must be made to feel that education is a lifelong process. Further, it is necessary to impart, at least to a broad elite of pupils, a zeal for learning, so that they will have an incentive to explore at closer range the terrains of knowledge which the school has only adumbrated. This attitude toward knowledge should be accompanied by a flexibility of mind: the readiness to accept change and appreciation of the need to learn more, above all, to relearn much of what has already been learned.

The Importance of General Education

My second thesis is that prolonged time for schooling must be chiefly used to enlarge the basis of general education, and not to impart specialized vocational proficiency to the young. Only a few years ago, when we in Sweden were still debating the structure of the compulsory nine-year basic school, there were some who argued that the ninth year, or even the eighth year, should be largely devoted to preparatory vocational training and, in certain cases, training for specific occupations. It is easy to sympathize with the reasons for this view. Local supplies of manpower may fall short of meeting an urgent demand. Young people themselves are eager to earn money, and may find it easy to get jobs which require little in the way of previous skill, though it should be added that the demand for unskilled manpower is consistently declining. As for their parents, who grew up in a society of limited educational opportunity (indeed, the job world asked little of them in this regard), many of them would still like to see their offspring earning their livelihood as soon as possible. Understandably, too, these inclinations may be encouraged by the teachers, who certainly have no easy time maintaining discipline in their book-weary pupils who, it should be added, are often not provided with instructional programs and methods adapted to their needs.

A solid background in the skill subjects equips a person with instruments that can be applied to a broad spectrum of situations, many of them unforeseen, both in the job world and outside of it. The person who speaks and writes his native tongue and one or more foreign languages fluently, who commands the fundamentals of mathematics, who has learned how to learn and is able to continue studying on his own, and who has learned to think in the categories which categorize the content subjects, that person will possess extremely useful tools which will enable him to cope with changing conditions and requirements. We know that the greatest difficulties of retraining for new and more highly-skilled occupations are encountered by those with the poorest formal education. The United

States constitutes an example of this, a country with a remarkable paradox: on the one hand, several million employees rendered redundant by mechanization and automation; and on the other hand, a shortage of skilled workers, despite the fact that they can be counted in the millions.

The process of change is also constantly at work in our leisure-time lives, making flexibility no less imperative in this sector. The mass media, not least television, have expanded our horizons in a way which was unthinkable fifty years ago, when most of us did not see beyond our own parishes or communities. Nor is it only the complications of the international scene that have been admitted to our living rooms. These media incessantly convey information which did not even exist when we went to school. This means that a great deal more needs to be done in the way of interpretation.

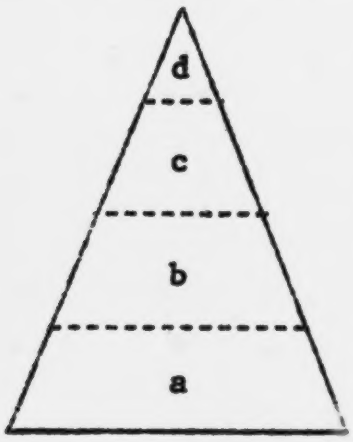
The Structure of Qualifications in the Job World

Let me now try to adduce the consequences of a rapidly changing society for the pursuit of our working careers. I shall do so in relation to two diagrams which, though they are highly schematic, will, I hope, illustrate the points essential to my argument.

Figure 1 shows the conventional qualifications pyramid. The job world has been generally assumed, and for the most part rightly so, to consist of a pyramidal structure, within which different strata or levels may be discerned in regard to requirements and status. The pyramid presupposes a system of education which caters to each stratum separately, until recently the case in Europe. Not long ago the Deutscher Ausschuss für das Erziehungs - und Bildungswesen contended in their report on the school structure in the Federal Republic of Germany, that the Volksschule catered to the needs of all the people, whereas the Gymnasium was preparing for the professions and the Mittelschule for the lower-middle-class occupations. Relatively slight mobility between the different strata of the pyramid is assumed. All the same, there may be considerable mobility within each stratum.

The classical model for a large industrial firm would then look something like this. At the bottom of the pyramid we have a big stratum of relatively unskilled workers, with usually no education beyond elementary school. At the next level we have a much smaller stratum of white collar workers with at least a lower secondary academic education and perhaps some pre-university education as well. At the top we have a very small stratum of people from the universities. When we study the educational debate that was waged in Sweden from around 1880 up to the 1940's, we find that most of the people who gave thought to the matter conceived of such a pyramid both for the educational system and the economic sphere. As late as 1944, a commission of inquiry was saying that it was wrong in principle to enable all intellectually qualified pupils to continue into secondary academic education as a charge on public funds. According to the commission, such support would not only starve the manual trades of gifted manpower, but would also create an intellectual proletariat. As an example the commission cited the threatening surplus of teachers! Both this inquiry and its predecessors were imprisoned by static approaches to the problem of school and society.

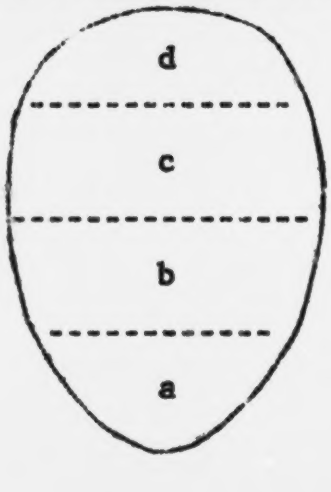
Fig. 1. The Conventional Qualifications Pyramid



a. Unskilled workers
b. Skilled workers (mainly manual)
c. Office, supervisory and technical personnel without university education (middle school)
d. Executive and technical personnel with university education

Figure 2 is not directly meant to be the proverbial Egg of Columbus, though the resemblance is informative. The structure of qualifications in regard to both general education and vocational training tends to change from a pyramid and to take the shape of an egg, with the narrowest end at the bottom. There we find a rapidly diminishing group of job openings for which little or no vocational training is required. Above that we have a broad stratum of workers, who will not only be required to have more formal education but who will also have to take further education and undergo retraining to a great extent during the course of their careers. The stratum above, increasingly difficult to separate from the manual workers (indeed, it might be more apt to call them technicians) contains a group of white collar workers or salaried employees. At this level, too, there will be a much greater need for further education and retraining. Consider for a moment the impact that electronic data processing and other office automation have already had on salaried employees in many industries. At the top we have two strata, the one representing people who have completed education of pre-university standing, while the other consists of the university graduates. The membership of both these strata is rapidly expanding. Today's 40-45-year-olds in Sweden belong to a generation in which no more than one in every 20 persons qualified for university entrance, while more than one in every five of today's 20-year-olds possess the same qualification. By 1975 the proportion of young people entering the job world with a pre-university education or its equivalent is projected to be more than half.

Fig. 2. The Qualifications Hierarchy, Somewhat Exaggerated, As it Will Look Before Long



Demands for Further Education in a Static Economy

As indicated above, this way of illustrating the qualification hierarchy is grossly schematic, and we should not permit outselves to get bogged down in it. This caveat applies with even greater force to my outline of particular details regarding the hierarchy. The essential fact is that we are in the midst of an educational explosion which does not take place in a vacuum but in response to the demands of a rapidly changing economy. Given our background for discussion, we should now ask: What do these changes entail for the working adults who left school a long time ago, irrespective of the level at which they finished?

Let us follow the career of a hypothetical character whom I shall call "Mr. A". In the pyramid-shaped system, Mr. A. could expect to retain the same status throughout his working life, provided he did not advance from one level to another, promoted so as to enter the next higher stratum. The longer the time elapsed since he finished his education, the more he is likely to have forgotten what he learned at school. A large part of this loss has presumably been offset by the experiences gained on the job. Von Weizsäcker has offered a theoretical model purporting to show how the knowledge of a chemist with a university degree deteriorates and what this means in terms of the necessity to keep up to date. On the basis of certain assumptions, Von Weizsäcker arrived at an annual deterioration rate of 3%.

As was stated earlier, the pyramidal structure presumes a relatively static economy, at least static in the sense that the changes are not of dramatic magnitude. In it, roughly the same structure of production techniques and occupational requirements prevails after 20 years or so. Given these conditions, our Mr. A. may find it necessary (to an extent which obviously will vary a good deal from one occupation to another) to keep refreshing his previously acquired store of knowledge and skills. However, he need make no particular effort to keep in touch with new developments in his field of competence since, on the applied side at any rate, there are likely to be only a few innovations.

Demands for Further Education in a Dynamic Economy

Within the egg-shaped system or, more accurately, within the structure which during the course of one generation is in the process of being transformed from a pyramid into an egg, conditions will be different for Mr. A. Let us assume he was recruited to start in stratum "c", where he was assigned to perform fairly specialized office work. During his term of service more and more employees have entered the stratum above his. When these persons first joined the company 20 years ago, they may have comprised between two and 3% of its work force. Mr. A. knew many of them. Since he started with the company their numbers have increased to between eight and 10% of the total. By the time he is pensioned 20 years hence, their proportion will probably exceed 20%. Thus, in the 40 years of his working life, Mr. A. has experienced considerable relative loss of status. More and more people have been placed above him in the hierarchy. The majority of these newcomers were young when they started, and many of them took only a few years to reach their present higher-level positions after completing their education.

If Mr. A. is to be able to function at the level for which he was originally trained, he will have to add to his store of knowledge from time to time, notwithstanding the experience he has gained on the job. If his duties are essentially altered, he may have to submit to retraining. But even if nothing more drastic happens to change his work situation, he will still have to pursue some form of further education in order to grasp the techniques which are gradually being introduced, and in order to get the background needed to perform satisfactory work. Thus he will not only have to brush up old knowledge and skills, but also acquire new knowledge and skills. Assume further that Mr. A. does not want to lose relative status: in other words, he is bent on climbing so as to keep pace with the structural changes taking place in the qualifications hierarchy. He must then return to the school bench from time to time for a more sustained and systematic effort to assimilate not only knowledge of a general nature, but also the specific vocational know-how that will enable him to keep up with the transformation itself. However, this is not a question of advancement in relative terms, since structural transformation within a company serves to advance the qualifications of most employees.

The Unfolding of Careers

Given the conditions herein outlined, what shape will careers take in the future, especially for those who belong to the upper stratum in the "egg"? Research in this field is still rather meager. Neymark's (1961) study of a representative group of Swedish working males has already been discussed. In another project I am following the careers of about 1,400 persons in the city of Malmö, all of them born in 1928. We have been accumulating educational and vocational data as well as test data for this group since 1938. Its members will soon be reaching their forties. In the United States a study is being made by Donald Super closely following the progress of a group of young people from the age of 14 to 25 and beyond. The main purpose of this study is to determine whether the degree of vocational maturity at the age of 14 can be made to predict progress in adulthood. Super's researcher, Martin Hamburger, has pointed out that the vocational preference of present-day youth must be seen in the light of changing times. The more capable youngsters in particular are strongly oriented towards the future. They sense more vividly than previous generations that certain occupations are fading out, while others are emerging. During the course of a few decades, Hamburger found, the proportion of unskilled workers in the New York area fell from 33 to 8% of the gainfully employed. Indeed, the vocational preferences of today's young people must be viewed in relation to long-range projections. In the United States, certainly, the structural changes are so violent that opportunities sometimes outrun ambitions.

In tomorrow's job world, placement at a high level will require a longer period of formal education. An ever increasing number of those at the top will have pursued their education until they are at least 25 years of age. For this group the ensuing period could be characterized as one of establishment, to use Super's terminology. For potential executives in administration and production, the trial period which leads to establishment will be of quite a different character than for the youngsters who enter the job world in their teens.

Development of Proficiency in a Dynamic Economy

The development of competence will obviously vary greatly according to the industry, job and hierarchical level under consideration. It can be assumed that the person who has to apply specific basic knowledge will be required to review in order to counteract the loss that results from remoteness in time from schooling. However, this problem is of a lesser order for the person who does the work of planning, commanding and coordinating that devolves upon an executive. On the other hand, the person whose work primarily depends on sheer technical know-how will be compelled to keep constantly abreast of developments in this field. Let us assume that half the basic knowledge in his field is revised by scientific and technological advance over a period of 10 years. This means that he must renew his fund of knowledge at the rate of 5% a year. It would be asking too much to have the person do this on his own; instead, he must submit to a form of systematic further education at regular intervals. If his particular speciality has undergone large-scale transformation, he may even have to be trained again from the beginning.

The conclusion is inescapable: at all levels of qualification, today's job world imposes demands which yesterday's static society recognized to a much lesser degree, if at all. Those who occupy a lower level of qualifications must reckon that they will have to be retrained once or more during their working lives as technicians, with end results that may not bear the slightest resemblance to the kind of work they did when they first started. Those at a higher level, especially in engineering positions, will find themselves in a situation where a broad background in economics, social science, physical science and technology will equip them with certain fundamental concepts and principles, enabling them to add new knowledge to their fund without too much difficulty. Once an engineer has learned to think in basic physical categories, he will not be as susceptible to the whims of technological change as the one who has chiefly engaged in the applied aspects without really understanding the theoretical background. The researchers in education concerned with theories of curriculum building attach great importance to having pupils learn a subject like physics as a "discipline", as one distinct branch of learning. The pupils are then better able to keep up with the shifts or more ephemeral applications.

The Requirement to Readjust

At the higher levels of qualifications, the premium will be put on flexibility and readjustment, on the ability to be prepared for change and to accept it. It will be necessary, during the course of both formal education and in-plant training, to create a relativistic attitude. The man who recognizes that sweeping changes may occur is thereby much better equipped to meet them when they do occur. Such an attitude also makes for greater receptivity to new viewpoints and impulses, for a readiness to unlearn habitual ways of thinking. The top-ranking men entrusted with sophisticated management and engineering tasks will have to be more flexible and more creative than other categories of personnel.

They must not bog down in mechanical routines or thought patterns, for to do so would set them back far more than it would others. The company would then have no choice but to let most of the creativeness come from "young lions" recruited outside.

The in-plant or industry-wide training that must be provided to permit keeping up with developments in personnel administration, and a great deal more besides, must include help and guidance to permit gradual adaptation to new "roles". It will not be enough here to learn new technical methods or to understand their rational background. An executive will have to meet and discuss with colleagues and consultants if he is to adapt to the new roles related to his vocational and general social duties within the company and outside of it.

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XVI

THE ECONOMIC VARIABLES AFFECTING EDUCATIONAL ACHIEVEMENT

Working Group No. 1

To the economist, school achievement test scores measure an intermediate product along a flow in the development and utilization of human resources, in a process which begins before entry into school and extends on through working life.

The specific institutions in which the development of human resources takes place are: home, school, firm, and state.

Recent work on the assessment of the value of education has especially concentrated on comparing the returns accruing as income in adult life with the costs of schooling. However, it is also important to select portions of this life-long process for more intensive analysis.

The system operates as a result of decisions taken by different units at various levels. Both the criteria they employ in decision-making and the technical and economic alternatives available to them differ by type of unit.

1) The household is assumed to decide upon input combinations and amount of production of education at home and in school on the basis of its expectations of gain, its resources, the input prices that it faces, and the constraints emanating from the school system. Part of the variation in the application of inputs to the educational process could therefore be explained by variation in family resources and prices, explicit or implicit. The cross-national framework of study will provide broader variations in the conditions which households face.

2) The behavior of the firm can be conceptualized in essentially the same way.

3) While the process of decision-making at other levels (the school and the state) is more complex, it is important to study the inputs and cost-structure at these levels and to relate them to prices and factor-scarcities.

In each of these contexts, an important set of questions is of the form: Given that a certain increment of achievement can be gained by using a particular combination of inputs, what are the alternative increments possible using different combinations of inputs of equal cost?

A related question is of the form: Given a stated goal in terms of achievement levels, what is the least-cost combination of inputs which would realize this end?

An approach to these problems requires translating physical inputs into money costs. In what follows we concentrate on ways of measuring inputs independently of price. This does not mean that pricing is either impossible or unimportant, but merely that staying at the level of physical inputs permits us to value them in the context of a particular economic structure.

Within countries, absolute measures of monetary costs and returns are often acceptable, though both the existence of home production and the form of organization of the school system introduce some special pricing problems. For comparison of costs between countries, absolute costs are only acceptable when there exists a genuine international market for the factors involved. In education, most factors are not traded internationally, and index number problems of the familiar kind are a major obstacle.

It should be noted that identification of an optimum from what is actually observed to occur is not possible.

I. Measures of Economic Inputs

Classification into two major groups of inputs should be made:

inputs within the home;
inputs within the school.

In some countries there may be an important contribution made by inputs paid for directly by parents, but not provided in the regular school system (e.g., cram-schools and classes in Japan). In these situations a third category may be required.

Differentiated inputs of pupil-time, teacher-time, and parent-time into education should be measured by constructing time budgets. Thus a suggested pupil-time budget would include for a particular week the number of hours spent:

1. at school;
2. studying at home;
3. working in the home: paid/unpaid;
4. working outside the home: paid/unpaid;
5. watching television;
6. in travel to and from school.

A. Inputs made within the home

Parents' time in tutoring children;
Number of hours per week during which mother and child are both in home;
Pupils' time doing school work at home;
Expenditure on tutoring by the home;
Space allocation for the pupils' study at home;
Academic equipment in the home: desk, number of books;
Pupils' use of public library facilities;
Pupils' use of summer vacations (summer school, paid work, leisure, etc.).

The problem of weighting the value of parents' time in order that we might aggregate hours spent in tutoring by less educated parents with hours spent in tutoring by more educated parents needs attention. It is desirable to collect earnings data directly, but if this is not possible either levels of occupation or levels of education, or both, would lead to parental earnings data which would provide the weights to be used. Data on the number of children in the family are a control variable.

B. Inputs made within the school

Student-time budgets should be constructed by subject, number of class-minutes, number in class, and type of instruction (lecture, language lab, science lab, study hall, private project);

Teacher-time budgets should be constructed by:
  Hours of instructional activity in school;
  Hours of other activity in school;
  Hours of out of school grading;
  Hours of work with parents;
  Hours of work with pupils out of school.

These data should be distributed over subjects, over classes taught, over class-size, and over type of instruction (lecture, language lab, science lab, study hall, etc.).

Space inputs:

School space per student;

School space per type of use (e.g., lab, language lab, regular classroom, gymnasium, etc.).

Space inputs should be measured in physical measures (square meters) rather than in money measures.

Equipment inputs:

Some are easy to measure, e.g., number of library books in stock and circulation per pupil; number of recording tapes; language labs; number of TV sets and other items of audio-visual equipment. Usage may be more important than numbers.

But other items present difficulties of aggregation; rates of depreciation of equipment vary; and many countries do not have school-by-school data on equipment supplies or inventory.

Structure of inputs:

It was particularly emphasized that differences in the structure of inputs into education (e.g., ratio of school inputs to home inputs, or ratio of pupil inputs to teacher inputs, etc.) might provide significant explanatory and instrumental variables.

Cumulating inputs:

In Phase I of the IEA project, the main emphasis was placed upon measuring "current" inputs. But, school achievement in grade 8 depends to some extent on inputs into grades 1 through 7. It is important to measure cumulated inputs either by longitudinal studies (an ideal to move towards), or cross-sectional studies. These latter should not present great technical difficulty but they lead to problems in connection with migrating pupils, whose previous consumption of inputs may not be accurately measured, and to other problems referred to below.

It would be desirable to relate the gain in achievement during a given period (year) to the inputs during that period. This can best be done via longitudinal study.

If this is not done, some calculations which relate incremental inputs to incremental achievement are possible from cross-sectional data collected at a given time from two age levels, e.g., 10-year-olds and 14-15-year-olds. However, there are great difficulties involved in relating the achievement of 10-year-olds to those of 14-15 years without knowing which variables to control. Arbitrarily one can control type of school, father's education, rural/urban residence, etc., and use other input measures as variables. Methodologically, the procedure may be defensible (though there are problems of circularity), but the problems of data manipulation appear to be formidable.

Care should be taken to allow for repeating of grades by students when analyzing the relation of inputs to achievement scores.

II. Output Measures

The Problem of Aggregation

Von Weiszacker's paper identified the common problems which arise in aggregating into a single index the achievement scores within tests, within subjects, within individuals, and between subjects across individuals.

We paid particular attention to the latter problem, which is directly related to the problem of "fit".

The difficulty resolves to the problem of selecting an appropriate set of weights to apply to sets of achievement scores. It would be splendid if we could weight scores of 20 against scores of 80 in accordance with some known relative economic values of these scores. But these values are completely unknown. We can probably be confident that children with higher mathematics achievement scores are of greater value to the economy than children with lower scores, but we do not know by how much. And even if we had weights based upon present economic value of various levels and types of mathematical achievement, we would have no knowledge of future changes in those economic values.

However, though single indexes are difficult to construct, and may be misleading if they are constructed by taking arbitrary weights, there remain the standard characteristics of the distribution of achievement scores which may be of great interest to policy-makers.

Thus, we recommend that characteristics of skewness, kurtosis, etc., of countries' and other sub-populations' score distributions be reported and compared.

Longitudinal Studies

1) Follow-up studies during the school career are of use for cumulating total inputs into education;
2) Follow-up studies at the point of time when some students enter the labor market, and subsequently are indispensable if any progress is to be made toward linking school achievement to utilization of education in the labor market. The scope and duration of such follow-up studies into employment are probably too great for educational researchers to contemplate undertaking alone. These should, perhaps, prepare the way for others who are more centrally interested in labor market problems to carry the follow-up studies further after the first few years of follow-up have passed.

Types of Longitudinal Studies

The design of follow-up studies should permit analysis to relate types and amounts of further education and training to pre-work schooling and achievement. It is also important to relate achievement levels to types of further education and training:

1) further schooling of same type;
2) technical or further education and training different from general schooling;
3) on-the-job and informal learning.

The major aim is always to construct links between achievement, future occupations, and earned incomes.

III. Hypotheses and Variables

Many of the variables listed above can be tested directly for their separate effects on school achievement. Simple hypotheses of the type: "Moonlighting by teachers within (outside of) education is positively (negatively) correlated with pupil's performance", and "Achievement scores of pupils are positively related to the proportion of total teachers' time spent in active class teaching and demonstration" are examples.

In some cases, what is important for school achievement is the proportions in which inputs are combined. Examples are:

> "Given total educational contact hours between pupil-teacher and pupil-parent, the larger the proportion of pupil-parent hours in total contact hours, the higher the achievement scores.";

or: "The ratio of parental hours of tutoring to teachers' hours will be positively correlated with the degree of superiority of parental education over teachers' education.";

or: "The higher the pupil's IQ, the greater the marginal rate of substitution between library time and teacher time".

Here we need to get not only at the effects of different combinations of inputs upon achievement, but also at the economic quantities which help determine the combinations actually observed.

XVII

THE EDUCATIONAL STRUCTURE AND ITS CONTEXT

Working Group No. 2

This working group addressed itself to conceptualizing the total social system in which schools function, the school structure itself, the characteristics of teachers, and the links between the school and the community.

The political, religious, economic, and technological conditions prevailing in the country in question are fundamental aspects of the context in which the school system functions. The goals of government, the religious beliefs of the people, the economic resources used by the country, and the state of its technology all impinge upon the nature of the school system and on the way in which it functions.

Public and private support of the schools, and the degree of central or of local control, are administrative fundamentals which affect educational policy, organization, and content. The differentiation of schools at the various educational levels, the graded or ungraded nature of the grouping of students for instruction, the existence of tracks, homogeneous and heterogeneous groups, and distinct departments and schools are structural characteristics which affect the education to which pupils are exposed and the place toward which they move in the national economy.

The education of teachers must be viewed in terms of their verbal ability, the extent of their post-secondary education, the content of their programs, and the extent of their training in education as such. The roles and functions of teachers also contribute to the quality of the educational output, as shown in their role in determining the content of the curriculum, the selection of books and materials, and the relating of instruction to political, social, economic, and industrial issues.

The use of teacher time in the schools and after school hours is another variable of probable educational significance. The number of hours of teaching, preparation for teaching, extracurricular activity, and moonlighting no doubt affect the quality of education. The number and variety of subjects taught, the differentiation of elementary from secondary school teachers, and the nature and extent of in-service education may also be important variables.

The relationships of teachers to parents, to community groups of various types, and to business and industrial organizations also appear relevant.

The organization of guidance services, the qualifications of counselors and psychologists, and the services expected of them are another set of variables which may have a bearing on the quality of the educational output.

The examination system of the school involves still another set of variables. The form and content of examinations, their local or national origins, the intervals at which they are given, failure rates and possibilities of repetition, and the instructional use of test results, also affect the numbers and types of pupils progressing toward various fields and levels of employment in the nation's economy.

XVIII

THE EDUCATIONAL PROCESS

Working Group No. 3

Role Relations

Fundamental to the educational process, in the judgment of the third working group, are the student's relational involvements. The assumption is that role relationships affect achievement, and that an understanding of the characteristics of these relationships will throw light on what takes place in the process of education and on its outcomes. The major role relationships are those of the family, the peer group, and of the teacher-pupil complex. These and their possible effects and interaction, may be outlined as follows:

I. The Main Effects of Role Relations

A. Family System Variables

1. The parent as an educator. The more the parent plays the role of educator, the higher the level of the student's achievement as affected by time spent in helping the child with homework (perhaps only if he asks for help), and in trying to socialize the child to do his work and seeing that he schedules it in a routine manner.

2. Child training practices: impulse control. The greater the degree of impulse control (ability to delay immediate gratification in the interest of larger range goals) the greater the degree of achievement.

3. Family power structure variables. The more power the child has, relative to his parents, in family decision-making, the greater will be his academic achievement. This is likely to be true if the definition of the ideal student by the school involves more than sheer compliance.

4. Sex role learning. Interest here is in those aspects of sex role which are linked with school subjects (e.g., girls are not expected to be good at math). The exposure of the student to older siblings of the opposite sex will result in the acquisition of more role characteristics of the opposite sex. Girls with older brothers will exhibit higher math achievement than girls with sisters. Pilot surveys of the degree of sex role differentiation within different countries are needed.

5. Parent perceptions of ability. Able students perceived as able students will achieve at a higher level than able students who are believed to be lacking in ability. Low ability students believed to be able will achieve at a higher level than similar students perceived as lacking

in ability, and the variability of achievement in the former will exceed the variability of the latter.

6. Parental definition of the student role. The good student may be perceived in various ways by his parents, as one who is extrinsically motivated, compliant, autonomous, creative, intrinsically motivated, or popular, as one who gets along with his peers.

   The student's definition of his role will reflect the parental definition. This will be related to achievement, depending on its congruence with the school definition.

B. Peer Group Variables

Types of peer value systems relating to school work which may be identified are: valuing knowledge for its own sake (academic orientation), as vocational preparation (vocational), as a means of remaining in good standing so as to have fun ("collegiate"), and as valuing knowledge for its own sake acquired despite the school (non-conformist). It may be hypothesized that:

1. The greater the extent to which peers place a high value on academic achievement, the greater will be the achievement of any individual student.
2. The greater the number of peer cliques in a school, the less will be their effects on the individual student.
3. The stronger the demands for conformity to peer group norms, the greater their effects on the individual student.
4. The greater the isolation of a peer set, the greater its effects on the individual student.
5. Peer group definitions of sex role norms will affect achievement, if achievement levels are related to sex role definitions.

C. Teacher-Student Variables (covered in more detail by Charters & Torney)

1. Teacher expectations for students. Students should be extrinsically motivated, compliant, autonomous, creative, intrinsically motivated, or peer-directed.
   a. The more the teacher's expectations for the student converge with the student's expectations for himself, the higher the student's level of achievement. If the teacher wants compliance but the student wants creativity, there is also a management problem.

2. The complementarity of student-teacher expectations is directly related to the explicitness of teacher demands.

3. Complementarity is directly related to the allocation of rewards such as grades and praise for conformity to teacher demands.

II. Interaction of Role Relations

It is assumed that the greater the number of role systems which similarly define the student role, the greater will be the effect on the student.

A. The greater the number of role systems which define academic excellence as having high priority, the higher will be the student's level of achievement.

B. Where the expectations of different role systems are in conflict, the direction in which the student resolves the conflict is a function of the relative ability of each system to control rewards and punishments for the student.

C. Where expectations of role systems conflict, the direction in which the student resolves the conflict will be a function of his need priorities. For example, where his need for affiliation (acceptance or popularity) is greater than his need for achievement, the more likely he is to be influenced in the direction of his peer group.

D. The relative influence of different role systems may be expected to vary through time and cross-nationally.

   1. The higher the educational level, the lower the influence of the family.

E. The degree of symmetry between parent-child and teacher-student systems, in styles of reward and punishment, increases the effect of the system on achievement. These styles may be defined, for parents and children, as involving punishment only (avoidance conditioning), reward only (permissiveness), or reward and punishment (internalization). For teacher and students they may be categorized in the same manner as parent-child styles.

An illustrative hypothesis derived from the above is that if at home the child receives punishment only, as in many low socioeconomic level families, and if in school he receives rewards only, the school time spent on management problems will increase.

Opportunity to Learn

A second type of variable affecting achievement in the schools is presumably subsumable under the heading, opportunity to learn. Opportunity means exposure, encounter, availability, accessibility. It is defined as the inclusion of subject matter in course outlines, syllabi, and interaction between teachers and students, the amount of time spent on the topic, the possession or lack of required skills by the student, and by the meaningfulness of the sequence of topics in the organization of the subject matter. It does not include affective or perceptual elements, although it might be argued that lack of a needed attitude is similar to the lack of a needed skill, for both keep the student from having access to the subject matter.

It is assumed that achievement is significantly affected by the opportunity to learn which is provided by the school. Relevant variables are:

1. The topics offered, within and among school subjects, as evidenced by official documents, textbooks, examination questions, and reports from teachers and students.
2. The time assigned to instruction in school subjects.
    a. Number of hours per year.
    b. Proportion of all subject time to each subject.
    c. Proportion of class time given to instruction as contrasted with management.
3. Provision for the testing for presence of needed skills, e.g., can the student read and write well enough to study History?
4. Prerequisites for subjects, are the sequences of subject matter logical or merely traditional?
5. Instructional materials and equipment for each subject (e.g., size, availability, and required use of library and laboratories).
6. School provisions for analyzing pupil progress in subject matter.

Illustrative hypotheses based on the above state that achievement in any subject is related to:

1. presence of topics in syllabi;
2. assurance (e.g., through pre-testing) that students possess relevant skills;
3. percent of time devoted to instruction in class;

4. amount of time per year assigned to the subject;
5. relevance of the sequential ordering of subject matter;
6. availability and use of instructional materials and equipment;
7. quality of interim analyses of pupil progress in learning subject matter;
8. number of points in school year when student's pace and learning path may be altered.

Engagement with Instruction

A third characteristic of the educational process which is considered highly relevant to achievement is the degree of engagement of the students with instructional events, defined as the amount of time during which the student engages in active learning efforts. This time may be compared with time devoted to competing, alternative, non-learning efforts and events.

Especially significant is the kind of perseverence in learning that occurs independently of immediate direct supervision. Without putting too much meaning in the term, this may be referred to as autonomous perseverence.

A. Measures of Autonomous Perseverance

1. The amount of study, reading, etc., students undertake without deliberate assignment by teacher. A questionnaire could be devised.
2. Students may be requested by teacher to write on a topic which is ostinsibly for the teacher's own, private use. A measure of autonomous perseverance would then be a simple count of the number of words produced, although student attitudes toward teachers would have to be held constant.

B. Relations of Perseverance with Achievement

1. The greater the student's perseverance, the greater the achievement. This relation is, however, curvilinear, for when perseverance extends beyond a certain time on a given learning unit, the student perceives his efforts as failure and achievement diminishes rapidly.
2. The greater the student's achievement, the greater his autonomous perseverance. This, of course, is the reverse of the preceding hypothesis, except that its focus is on autonomous perseverance. It implies operation of a motivational force in the student intervening between perseverance, a purely behavioral measure (in terms of time) and achievement.

C. Determinants of Autonomous Perseverance or Engagement in Instructional Events vs. Perseverance in other, Instructionally-Irrelevant Events

1. Range or compulsion of alternative events (distractors).
   The greater the number (or compulsion of activities in which student may engage - in school, peer group, work, family - the less his autonomous perseverance.

2. Locus of self-identity.
   The more the student conceives of himself as a good student as distinct from a popular student, a good helper at home, a good family provider, etc. (the alternatives being dependent on the nature of the competing activities), the greater his autonomous perseverance.

3. Instrumentality of perseverance in instructional events.
   The greater the instrumentality or productivity of perseverance (as perceived by students) for the attainment of desired ends, the greater the autonomous perseverance.

   a. E.g., does extra reading lead to desirable survival in school, as perceived by student?

4. Normative support from relevant reference groups.
   The greater the congruity in role expectations of the family, peer group, etc., vis à vis the student (expectation that he will take seriously instructional events), as shown by behavior such as studying hard, getting good grades, enjoying school work, etc., the greater the autonomous perseverance.

5. Level of socialization in the classroom compliance system.
   The greater the student's belief that the teacher has a legitimate right to direct his behavior in classroom affairs (responding to directives without questioning why), the greater the autonomous perseverance.

6. Mode of teacher induction of power on students.
   a. The greater the teacher's reliance on either reward or punishment-based power in the classroom, the less autonomous perseverance is manifested.

   b. The greater the student's liking for the teacher, the greater the autonomous perseverance.

E. Note on Interaction of Determinants

There are logical interdependencies and contingencies among the foregoing determinants, and a more complex model could be developed. The speculative nature of the set suggests the wisdom of treating them independently, examining only for main effects and/or linear combinations. As it is, autonomous perseverance is an indicator of engagement which, in turn, is one of a combination of factors affecting (presumably) academic achievement.

Home-School Environments

It is assumed that cognitive learning is primarily influenced by the home environment and the school environment. For practical purposes other aspects of the society and the social system can be ignored except insofar as they influence either or both home and school environment.

A. Particular aspects of the home or school environment may differentially influence particular learning.

Hypothesis 1. Language development and problem solving are more influenced by the language emphasis in the home and by aspiration levels of parents (for their children) than by any factors in the school environment.

Hypothesis 2. Where the home is deficient in language emphasis and aspiration levels, varieties in the school environment will affect language development and problem solving.

Hypothesis 3. Where the home and school environment are supportive of each other in language development and problem solving, students will reach very high levels of development in these characteristics. Conversely, where both are deficient in these respects, the levels of development will be very low.

B. Where the home is markedly deficient in providing certain prior conditions, only rarely can the school environments be powerful enough to overcome these deficiencies.

Hypothesis 4. If the home is deficient in language development of the child, very few school environments can produce average or better achievement in language learning.

Hypothesis 5. If the home is deficient in language development, nursery schools and kindergarten classes (if directly related to these deficiencies) can produce significant developments in these areas.

Hypothesis 6. If the home is deficient in language development, much of school learning thereafter will be limited to the development of the lower mental processes (knowledge and comprehension).

C. The school environment builds on and is reinforced - or is not reinforced - by the home environment.

Hypothesis 7. While the home environment may be directly related to school achievement, more understanding of the phenomenan is afforded by using the home environment in relation to the school environment in relation to achievement measures.

Hypothesis 8. Different combinations of home environment variables related to combinations of school environment variables which in turn are related to specific outcome measures.

Variables to Study

The home environment can be assessed through a set or process variables. The most important process variables are:

1. Parent's aspiration for the child's education,
2. Language models in the home and the emphasis on quality of language,
3. Academic guidance provided by parents or others in the home,
4. Intellectuality of the home,
5. Variety of experiences provided in the home or by the family,
6. Emphasis in the home on the organization of space and time.

It is suggested that a simple questionnaire can be developed which can tap these variables. The classroom environment can also be measured through a set of process variables. The most important process variables appear to be:

A. Feedback on evaluation of learning
   1. The frequence with which evaluation procedures are used.
   2. The extent to which instruction is related to the use of diagnostic tests.
   3. The different uses of evaluation techniques during a school term.

B. The variety of approaches to instruction and learning
   1. The number of distinct teaching procedures used in a week.
   2. The variety of instructional materials used in a course.
   3. The variety of ways in which a student can be helped if he is having difficulty.

C. The communication of affect to the learners
   1. The frequency with which students are given achievement rewards.
   2. The frequency with which students receive positive affect from the teacher.
   3. The proportion of teacher communications (statements) which contain positive affect.

Curriculum Factors

There are a number of curriculum factors which affect the opportunity to learn and the work flow. These are frame factors and objective factors, which act as directing and limiting agents for the teaching process. Curriculum factors are viewed as independent variables in this schema, while process variables are dependent.

Frame variables include the intelligence and achievement level of the students at the beginning of instruction, the grouping of students into ability groups and streams, and the socioeconomic backgrounds of pupils, the backgrounds and training of teachers.

Objective or goal variables include the explicit and implicit directives given to teachers, as shown in syllabi, teachers' guides, etc. The prescriptions may be positive, or they may be negative.

There is a rank-order of curriculum-units with regard to their importance for the general goals of study. Thus, units may be divided into at least two groups with regard to importance: elementary units and advanced units, but this is only a simplified classification that may be carried out in much more detail. In this connection the main point is that within a given school or school-system, the objectives as to elementary units can be expected to be the same for all pupils within that system, simply because they all need to master these things in order to learn more on the subject or on another one (e.g., math for physics) or to succeed on a job. Apparently this mechanism will be more important in a subject, the structure of which may be regarded as "cumulative" - as mathematics, chemistry and to some extent also physics. A subject may be "open" in the sense that it is possible to start studying it from many angles - but that when the starting-point once is chosen there will be only a limited array of alternatives.

Some Basic Propositions

1. The total time at the teacher's disposal for the instruction in a given

subject is limited and the same for all classes of a given school-form.

2. Frame factors may be more or less favorable for the teachers function as a leader of the teaching/training process.
3. The general pattern or style of instruction is to some extent given from the start due to traditions, access to technical aids, other kinds of teaching materials, etc. Thus, two main patterns have to be considered here: ordinary classroom teaching and highly individualized teaching.

Role Analysis

The roles of teachers, peers, and parents all impinge upon and help to shape the role of pupil, which in turn is an important determinant of learning and of achievement. Many roles are learned through these relationships, for example, the role of student or of boy or girl.

Roles develop best when there is agreement concerning them among significant others. Thus, student roles are most highly developed when teachers, parents, and peers are in agreement and support each other in their expectations of students. When there is disagreement, role conflict develops, its solution depending upon the relative strength of the significant persons in that situation. The analysis of educational achievement therefore requires consideration of the nature and strength of parental, peer, and teacher expectations of pupils, and of the agreement or disagreement of these expectations.

XIX

ATTITUDINAL VARIABLES

Working Group 4

This group concentrated attention on attitudes to school, to society, and to oneself. These were chosen because of indications in the literature that they are likely to produce more meaningful results than more comprehensive and general variables of personality and attitudes. In particular, these variables were thought to be more relevant to comparative studies.

Attitudes Toward School

Seven dimensions of attitudes to school were identified as important, namely: Attitude toward school as

1. Providing a basis for a career through vocational training.
2. Providing a means of gaining the necessary credentials for the pursuit of a career.
3. Providing the basic general knowledge and intellectual skills needed in a career.
4. Providing an understanding of society and its institutions.
5. Providing an understanding of, and curiosity about, the physical environment.
6. Encouraging an interest in, and appreciation of, beauty.
7. Fostering a view of people as aids or barriers in social interaction; or an attitude to school as encouraging particular social habits, e.g., punctuality, politeness, etc.
8. Attempting to engender an understanding of, and sympathy for, other people, and promoting more abstract social values, e.g., integrity, responsibility.

In general these attitudes are pupil characteristics which affect behavior in school (predictor variables) and are affected by family variables and, especially, school experience.

Some Suggested Hypotheses

1. Where school provides good vocational courses, a training motive will correlate with performance on these courses, and be correlated with good school adjustment.

2. Where there is no provision for such courses, a training motivation will be negatively correlated with attainment, and positively related to seeing society as closed.

3. A high score on training motivation will be related to a tendency to choose courses for their vocational relevance, terminate education when employment opportunities present themselves, have relatively less difficulty in obtaining employment in periods of full employment, conversely, in periods of unemployment, to have greater difficulty in finding employment.

4. A credentials motive will in general be correlated with attainment, this relationship being rather lower in more permissive and progressive types of schools, and will be higher amongst pupils aspiring to professional work where this implies upward social mobility.

5. A skill and knowledge approach will show high correlations with IQ, SES, and attainment, except in conditions where the school is strongly vocationally oriented; will correlate more highly with attainment in: non-selective rather than selective schools, progressive-permissive rather than authoritarian schools, schools with 'loose' rather than 'tight' curricula; will correlate with an attitude to society as open and to be altered.

6. Attitude to school as providing insight into Social Institutions will be higher in non-selective and progressive forms of education; will correlate with attainment in civics, language, history, etc., more highly than math, science, etc., and this effect will be more marked in traditional, authoritarian schools than in progressive ones; will be correlated with IQ and social class status in selective but not (or not so highly) in non-selective systems.

7. Curiosity about the physical environment will be more highly correlated with attainment in math, science, etc., than with language, history, etc.; will be higher in more authoritarian schools, with tighter curricula; will, if high in vocationally oriented courses, be associated with low school adjustment.

8. These attitudes of understanding and appreciation will be highly dependent on family background, especially status and encouragement factors.

9. Attitudes of appreciation and consideration will be strongly related to choice of subjects, and orientation towards further education after school.

10. Attitude to school as providing an understanding of people as aids or barriers or as providing a sympathetic view of people represent two rather subtle dimensions of the integration of perceptions of people. They will primarily appear in the equations as dependent variables and as variables likely to show marked age trends which may be facilitated or retarded by experience at school.

11. These last attitudes are likely to be related to Age, IQ, SES, and family encouragement variables, and these are likely to be stronger in

authoritarian, work-oriented schools and lower in permissive schools emphasizing socio-cultural aspects of education.

Attitudes Toward Society

Attitudes toward society were considered in a way rather similar to Rosen's formulation of the achievement syndrome. This starting point has the added advantage that there are already a number of measures of a group type in this area. Three main dimensions were proposed as likely to be of most value in this connection:

1. A view of society as opened rather than closed; as full of opportunities, and essentially receptive to enterprise.

2. A view of society as static and well-ordered, with many role positions ready to be filled, as opposed to a society in which one has to make one's own way.

3. A dimension of success and future orientation, with a willingness to postpone current satisfaction in favor of some future gain. A fourth attitude, competence or efficacy, was discussed, but discarded on the grounds that its definition and possible measurement were too vague.

In general, these attitudes were conceived as primarily predictor variables, although the relations between them and the criteria may vary as a function of the enhancing or counter-balancing effects of the institutional variables.

Some Suggested Hypotheses

1. A pupil viewing society as open will tend to show:
   a. higher attainment;

   b. more preparedness to seek out educational opportunities (this correlation will be enhanced by non-selective and more permissive styles of teaching);

   c. such a pupil will tend to choose arts rather than science subjects.

2. A view of society as static will, in combination with a view of education as mainly of strategic value, lead to high attainment.

3. Being the rejected student in a selective educational system will tend to enhance views of society as static and closed.

Attitudes Toward Self

There is a demonstrated relationship among the ways in which a person structures his experience (i.e., the ways in which he gives meaning to and organizes that portion of experience designated as self) and his achievement in school. The evidence indicates that the relationship between these two variables is greater when that portion of self which is associated with the specific situation of interest is examined. Simply said, in predicting the behavior of a person in a situation, one gets better results if one inquires how that person has defined himself with regard to that situation.

Thus in the design of research on achievement in school across a set of nations, one inquires into a person both generally and specifically with regard to school situations. Operationally, one would measure such aspects of a person's self structure as the kind of

1. person you are now;
2. person you would like to become;
3. adult person you think you will become;
4. student you are now;
5. person teachers (i.e., the school system) would like you to be;
6. person you feel teachers would like to have in the classroom (general set towards student role).

Some Sample Hypotheses

Attainment in school will be greater,

1. the greater the congruency between Self Now and Self as Student;
2. the greater the congruency between Self as Student and "Person Teachers would like me to be";
3. the greater the congruency between Self as Student and "Person Teachers like to have in the classroom";
4. the greater the congruency between Self Now and "Person Teachers would like me to be".

Such measurement over a period of time would indicate the changes which the school has produced in the student. This measurement at various levels of schooling (e.g., elementary, junior high, senior high) would indicate the degree of similarity of expectations which the school has for its pupils. This measurement over different subject matter areas would indicate the degree of similarity of "person" which particular configurations of knowledge (as represented by the teachers) demand of its students.

XX

AN ATTEMPT AT A COMPREHENSIVE MODEL OF EDUCATIONAL ACHIEVEMENT

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Elements of an Educational Systems Model

Outputs. From the beginning of the Cross-National Project's work the notion of "yield", developed by the IEA Mathematics Study, had considerable appeal to the conferees. This term, similar to the concept of "output" as used by economists, developed from the relating of achievement scores in mathematics to the percentage of members of an age group reaching a given level of schooling. Thus the U.S.A., which has a low average attainment in mathematics if one merely looks at averages, stands out favorably with the leading countries in mathematics if one compares the cream of the American crop with the cream of other crops, and actually does better than most if one also examines the percentages of all youth attaining various levels of competency. A measure of yield, it became clear, should not be based merely on the average scores made by pupils reaching a given grade, but on more complex measures of percentages of potential pupils reaching given levels of mathematical competence.

It was recognized, too, that enabling a certain percentage of an age group to achieve a certain score on a mathematics test, i.e., to master certain mathematical principles and skills, is not an ultimate criterion of educational output. One must still inquire as to the relationship between that educational yield or production record and the utilization of that product by society.

This has been a concern of manpower economists for some years. The Office of Economic Cooperation and Development has devoted many manhours to its study, and in some countries educational planners seek to relate the capacity of the educational system to the manpower needs of the government and of the economy.

The idea of producing needed numbers of mathematicians, but not producing more than are needed while underproducing engineers or chemists, is one that has considerable appeal.

The problem here is that some manpower planning has assumed a one-to-one relationship between the unit of production and the unit of consumption. A graduating engineer, at the end of the education production line, is assumed to be or not to be an engineer in consumption, when he goes to work in business, industry or government. Similarly, it is assumed that anyone employed as an engineer must have been trained as an engineer, that any job calling for an engineer will be done by an engineer, rather than by a mathematician, physicist, psychologist, or technician (with or without reassignment or redefinition of duties or retraining of the employee).

Utilization. Ideally, output studies would include data on the extent to which knowledge and skills acquired in school are used in society. Measures of this relationship would serve to evaluate (1) the extent to which the schools educate people in ways which prove useful to them in society, (2) the extent to which the economy makes use of what the schools produce, or (3) the balance of supply and demand. But the notion of utility raises serious problems, for the usefulness of an education in physics as Wolfle (1954) has pointed out, may manifest itself in ways other than in employment as a physicist. It may be seen in service performed on a congressional committee on scientific research by a physics major turned lawyer. It may also be seen in the help given to her children in discovering the fascination of science by a mother who once minored in physics, laying the foundation for the children's eventual scientific careers. Scales for the immediacy and social significance of the use of knowledge and skills could no doubt be constructed and applied to the subjects of a study, despite the problems of comparing direct and indirect, vocational and avocational, uses.

A group of economists interested in the notion of utility has focused, not on demand as the fundamental and inflexible variable in supply and demand relationships, but on both supply and demand as flexible variables in benefit-cost and rate-of-return relationships. Here the question is not one of the utilization of the product, but on how the cost of producing it relates to the use to which it is put. Rate-of-return analysis makes explicit comparisons of benefits with costs. Demand is viewed as flexible, aided by job experience and on-the-job training or learning. It treats these last as extensions of formal schooling which vary with manpower needs and the availability of trained manpower.

The provision of good specialized vocational training in the schools appears better by manpower planning standards, for it delivers the most readily employable new workers to industry, but the emphasis on basic educational skills and on ability to learn appears better by rate-of-returns analysis, for in the long run it is less expensive in a dynamic economy to deliver trainable personnel who can keep on learning than to deliver trained personnel ill-equipped for continued learning with changing demands.

But the problems of delay in the maturing of utility criterion data are serious. It may be necessary, therefore, to settle for an immediate criterion, to rely on expert judgment of the social utility of each type of knowledge and skill, and to judge the output by the yield. Yield can be defined as in the IEA Mathematics Study, the percentage of youth of a given age attaining a given degree of competence. Or, it can be defined in terms, not of knowledge acquired, but of attitudes developed - criteria less directly related to the economy but nonetheless valued.

Input. The comparison of what a system produces with the cost of producing it brings a shift from exclusive emphasis on outputs to a simultaneous consideration of inputs, that is, of what goes into a system.

Financial Inputs. The financial inputs are the inputs which first come to attention in this way, for these reflect the direct costs of the product. The percentage of the gross national product or of a state's income used for education is an example. We have long been familiar with some input measures used in education, both direct financial inputs as shown in per-pupil costs, a ratio of human to financial inputs, and indirect financial inputs as reflected in facilities or processes such as teacher-pupil ratios, class size, library-books-per-pupil, and ratio of educational specialists to classroom teachers.

Pupil Inputs. The IEA Mathematics Study used a number of pupil input measures as well as its output measures in order to make meaningful international comparisons. The socioeconomic level of the homes from which the children came was of course one measure of the human material which enters the system and with which the teachers and others work. Pupil attitudes are another input, for pupils bring from home attitudes which affect their ability to use their learning capacities in school. These are elaborated upon in the report of Working Group 4.

Conditions of Production. A third type of input consists of the conditions of production. These include the economic conditions which modify financial support, the social conditions which determine who is educated and for what, and the political situation which affects the amounts of money available, the purposes for which they may be used, and even the ways in which they may be used (the effects of business cycles and the U.S. Supreme Court decisions on segregation are good illustrations).

Processes: Structure and Operations. The processes, or structure and operations, used in education vary in effectiveness and in acceptability, and may therefore be a basis for the assessment of the quality of education. Sometimes the judgment of quality may be made solely on *a priori* grounds, as a value judgment; sometimes it may be made on the basis of evidence of the relationships between practices and outcomes.

Structure. The structure of an educational system may be presumed to have effects on the pupils going through it, as well as on the administrators and teachers in it. The nature of these effects is often judged more on the grounds of social or personal philosophies than on the basis of empirical data, as in discussions of the relative value of selective as opposed to comprehensive school systems. But it seems clear that the availability of education, as in the proximity or remoteness of elementary schools, secondary schools, and colleges, does have a direct effect on who goes to school (in some communities college-going has been doubled by the opening of a community college). Structure includes not only the number and geographic relationship of one level of school to another, but also the division of functions among schools, the prestige hierarchy in which they are ordered, and the distribution of support among these parts of the system.

Agents. The agents of the school system are also important elements in the processes of education. The ratio of teachers to pupils, to specialized support personnel, and to administrators, the preparation of these staff members for their work, and their attitudes toward pupils and toward education, are all factors in the educational process which presumably affect its quality. If this were not assumed, we would not seek to control class size, examine credentials, or provide in-service education on such topics as understanding the disadvantaged child.

Curriculum. The curricular provisions of the school system are another familiar element in the assessment of the quality of educational processes. Such matters as the availability of differentiated programs for various college-going and non-college-going youth need no elaboration.

Instructional Methods. The methods of instruction are also familiar. The IEA Mathematics Study considered, for example, the perceived freedom of the teacher to handle a topic in his own way, and the use of homework, as well as various other educational practices. Despite the amount of attention given to the study of instructional methods, however, we still have much to learn in the description and evaluation of their use.

Equipment. The equipment supplied for use in instruction is another type of variable which constitutes the educational process. It includes the amount and purpose of space, the books and other materials used in presenting information or providing experiences, and even the buses which take pupils on educational field trips. Variations in type (function) as well as in amount (expenditures) of equipment are important.

The Model

Systems models are designed to show how the interrelated elements of a system are actually related, and how their relationships affect their functioning. The approach to a system can focus, we have seen, on what goes into it (input), on its functioning processes, on its achievements (output and utilization), or on some combination of these. The interests of logical as well as of theoretical systems builders have generally been on either input-output, i.e., economic models, or on organic models. Economists and business men have tended to think in terms of input and output, of the supply and demand of manpower, and of costs and benefits or of the returns from investments. Educators, on the other hand, have tended to think in terms of the organism, of the goodness of the structure and operations of the institution itself as reflected in the processes which characterize it.

Organic Models. Organic models, which focus on educational processes, appeal to educators in two important ways. The first of these is the analogy with physiology and medicine: the healthy organism, the good institution, the effective system, is that in which the basic functions are performed well, the elements are well articulated, and the processes work smoothly. Food which is eaten is digested, destroyed tissue is carried off and new tissue is rebuilt, germs are cast off, the body performs its usual functions. Health, a well functioning organism, is good. The second reason why organic models appeal to educators is that, just as physicians are the best judges of the health of a body, educators are often deemed the experts with the clearest claim to be judges of the soundness of an educational institution.

It is fine for an organism to be sound. But health is not enough. One may also ask what the organism does, what it produces, with its soundness. How fast can it run, how well can it read, write, or calculate? And if it is ailing one may still ask, what does it do, how well does it do it? Milton was blind, Beethoven was deaf, Robert Louis Stevenson was ill, Steinmetz was crippled, during substantial periods of their productive careers, but what they produced was of high quality despite their organic unsoundness. The list of such people is a long one. Obviously, one does need also to consider output, and we have already seen that output must be related to input.

Economic or Input-Output Models. The emphasis which input-output models put on the quantity and quality of what is produced in relation to the resources expended in production appeals to business men and to government officials. The model is an economic, a budgetary one, and assessment can be summed up in seemingly neat figures. One can compare the output units (pupils) distributed to colleges, to industry, to the military, to the relief rolls, and to the prisons. One can compare the achievement test scores made by pupils at various grade levels and in various curricula. Inputs can be taken into account in ways which are readily understood and which make comparisons legitimate.

But such models have generally not taken the sometimes nonproductive but nonetheless valued characteristics of the processes into account. An authoritarian system may have a better cost-benefits ratio than a democratic system, large classes may be as effective by all available output criteria as small classes, ugly buildings may provide as good an education as attractive buildings. But educators and laymen alike may prefer the morale that is associated with democratic policies and procedures, the greater opportunities for pupil-teacher contact that come with small classes, and the aesthetic impact of beautiful buildings and grounds. It has been pretty well demonstrated in industry, for example, that job satisfaction or morale is not related to productivity, but management still devotes substantial resources to maintaining worker morale. One may argue that morale affects profits in the long run through reduced turnover and reduced training costs, through word-of-mouth advertising by employees and their families, and other remote or invisible processes affecting ultimate criteria in unassessable ways. But that merely proves the point. Some values which are taken into account by organic models are not taken into account by typical input-output models.

A Functional-Organic Model. What is needed is a functional-organic model of a school system. Such a model would take into account not only the soundness of the institution as judged by organic process criteria which reflect internal structure and operation, but also the success with which the institution performs its functions of preparing the students it admits for eventual adult life, that is, its input-output-utilization functions. A functional-organic model is one which takes into account input, structure, operations, output, and utilization. It reflects concern for the soundness of the institution as an institution, and it recognizes that even a healthy organism is a luxury unless it performs effectively a socially valued task.

The accompanying diagram is an attempt to portray the model schematically. The columns represent components of the system: Inputs, Structure and Operations, Outputs, and Utilization. The rectangles represent types of elements, with the double lines indicating the flow of pupils and funds through the Production Conditions to participate in, use, or support the educational Structure and Operations with resulting Outputs or products which are utilized in various ways after the completion of formal schooling. The items _in_ the rectangles are illustrative elements.

The triangles represent ways of analyzing the relationships of the various components and elements of the system, the symbols in either half of the triangle standing for human or financial causes (on the left side) or effects (on the right side). The multiplicity of single lines represent the flow of data from rectangular sources (elements) to the triangular foci of evaluation. The lines are confusing, but then so is the system itself in real life. But examples will help clarify things.

1. One may be interested in the effects of an increase in the Total Funds available for education, with Pupil Inputs held constant, on the educational Structure and Operations. It may be assumed that such an increase in the operating budget will not affect the Educational Structure, but that it will affect some of the Agents. Given also certain Parental Attitudes (Human Inputs), one may hypothesize that the increase on Funds will affect the Teacher-Pupil Ratio. This can be empirically verified. The hypothesis may then be set up that an increase in the Teacher-Pupil Ratio will lead to, let us say, increased Output in the form of achievement (Knowledge) and a constructive Attitudes toward authority in school-leavers. The Achievement hypothesis was not supported by the IEA Mathematics Study. The Attitude hypothesis was not examined, but if it were it would be necessary, I am sure, to hold at least one other Process variable and one other Pupil Input variable constant, namely Teacher and Pupil Attitudes, for more pupil-teacher contacts could improve or worsen

pupil attitudes toward authority, depending on what each party brings to the encounters.

2. Or take a second example. One may be considering an increase in the use of the educational Operation, Homework. One can assume no effect on Financial Inputs, as homework usually costs the schools nothing, but one could hypothesize some effect on the Human Inputs in the form of Pupil Motivation (whether good or bad depending upon existing Pupil, Parental and Teacher Attitudes) and on Output in the form of knowledge and perhaps on Utilization in the form of increased flow of Manpower to higher level occupations. In the IEA Mathematics Study the devotion of a greater amount of time to homework was indeed found to be associated with achievement scores, but whether these variables are caused, one by the other, or both by some third variable is uncertain.

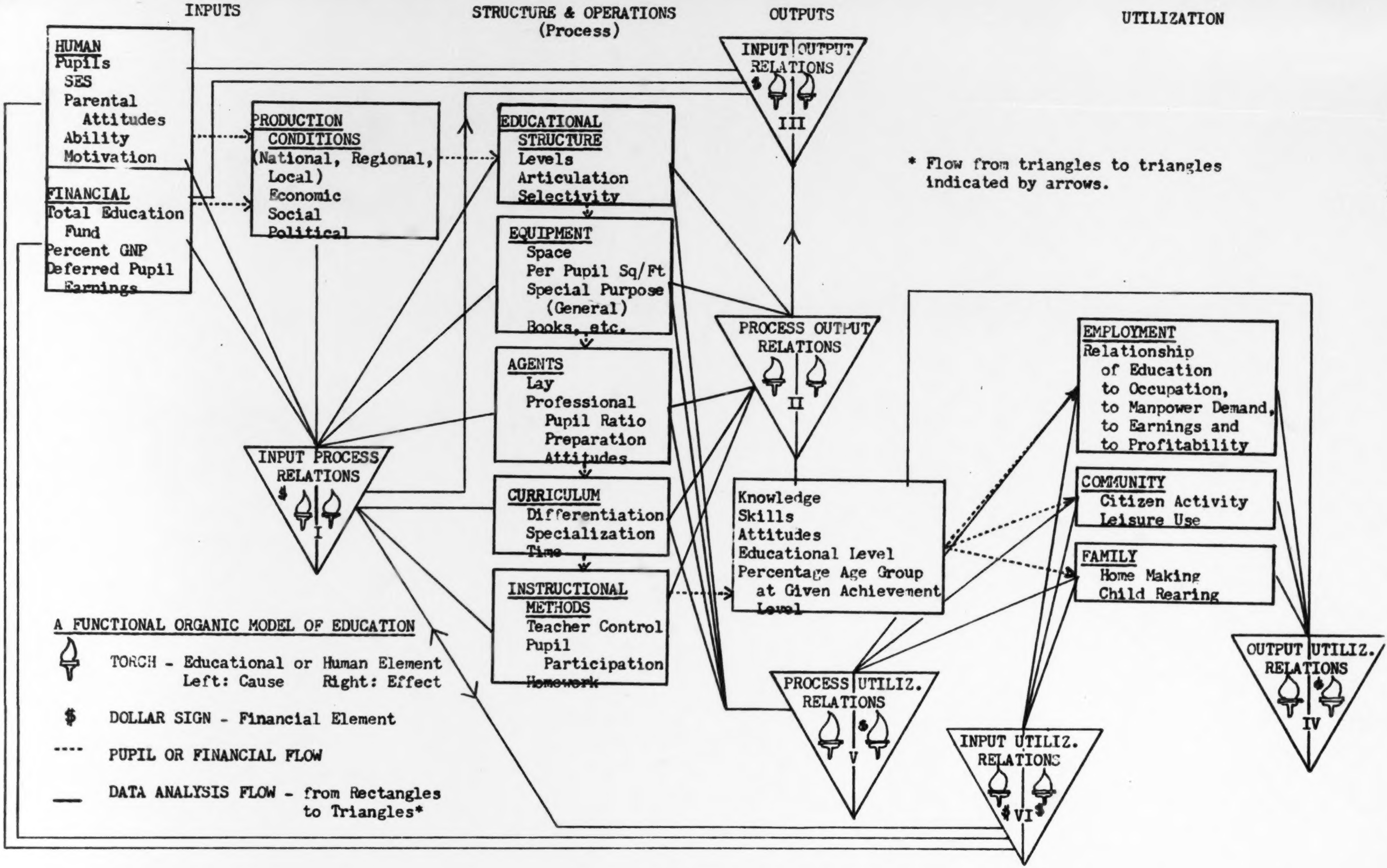
Conclusions and Implications

Models of this type may be helpful in suggesting possible causes of events observed in the system, and in suggesting possible effects if certain changes are made in the system.

Models tend to be schematic, and hence oversimplified, but in their very simplification they serve to bring out the fundamental characteristics of systems. This model helps to highlight the different foci of evaluation. The dollar signs tells us where the average citizen, with his business orientation, is likely to look, and the torches tell us where the average educator (and some of the parents in the PTA) are likely to look, in evaluating an educational system. The fact that there are six such foci indicates that there is no single approach to evaluation.

Evaluation must shift its focus depending on the issues. Is the question whether or not one can afford certain educational processes? Triangle I is relevant. Is the question one of choice of methods for achieving a certain mastery of subject matter? Triangle II is appropriate. Is the question the social usefulness of a given school subject? Triangle IV deserves attention. Is the question the adequacy of an established quality indicator such as Up-to-Dateness, or of a new set of quality indicators, such as those assessing Pupil-Teacher Interaction? Both indicators deal with Operations, with Instructional Methods. We may consider these important and be ready to make necessary value judgments. But would we be really satisfied to rely on criteria which are strictly organic, even the best, without regard to function? Will taxpaying citizens be satisfied with organic criteria alone?

It seems likely that we should supplement them with functional criteria such as Output or Utilization measures, for both educational and strategic reasons.


A FUNCTIONAL ORGANIC MODEL OF EDUCATION

INPUTS
STRUCTURE & OPERATIONS (Process)
OUTPUTS
UTILIZATION
HUMAN
Pupils
SES
Parental Attitudes
Ability
Motivation
FINANCIAL
Total Education Fund
Percent GNP
Deferred Pupil Earnings
PRODUCTION CONDITIONS
(National, Regional, Local)
Economic
Social
Political
INPUT PROCESS RELATIONS
$
I
EDUCATIONAL STRUCTURE
Levels
Articulation
Selectivity
EQUIPMENT
Space
Per Pupil Sq/Ft
Special Purpose (General)
Books, etc.
AGENTS
Lay
Professional
Pupil Ratio
Preparation
Attitudes
CURRICULUM
Differentiation
Specialization
Time
INSTRUCTIONAL METHODS
Teacher Control
Pupil Participation
Homework
INPUT OUTPUT RELATIONS
$
III
PROCESS OUTPUT RELATIONS
II
Knowledge
Skills
Attitudes
Educational Level
Percentage Age Group at Given Achievement Level
PROCESS UTILIZ. RELATIONS
$
V
INPUT UTILIZ. RELATIONS
$
VI
$
EMPLOYMENT
Relationship of Education to Occupation, to Manpower Demand, to Earnings and to Profitability
COMMUNITY
Citizen Activity
Leisure Use
FAMILY
Home Making
Child Rearing
OUTPUT UTILIZ. RELATIONS
$
IV
* Flow from triangles to triangles indicated by arrows.
TORCH - Educational or Human Element Left: Cause Right: Effect
$ DOLLAR SIGN - Financial Element
---- PUPIL OR FINANCIAL FLOW
— DATA ANALYSIS FLOW - from Rectangles to Triangles*